

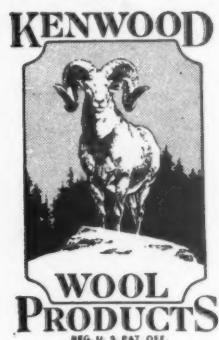
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19 1929

PACIFIC PULP & PAPER INDUSTRY



1929

REVIEW NUMBER



F. C. HUYCK & SONS

ALBANY, N. Y.

Manufacturers of

**KENWOOD FELTS, TANNED FELTS
and KENWOOD TANNED JACKETS**

are pleased to

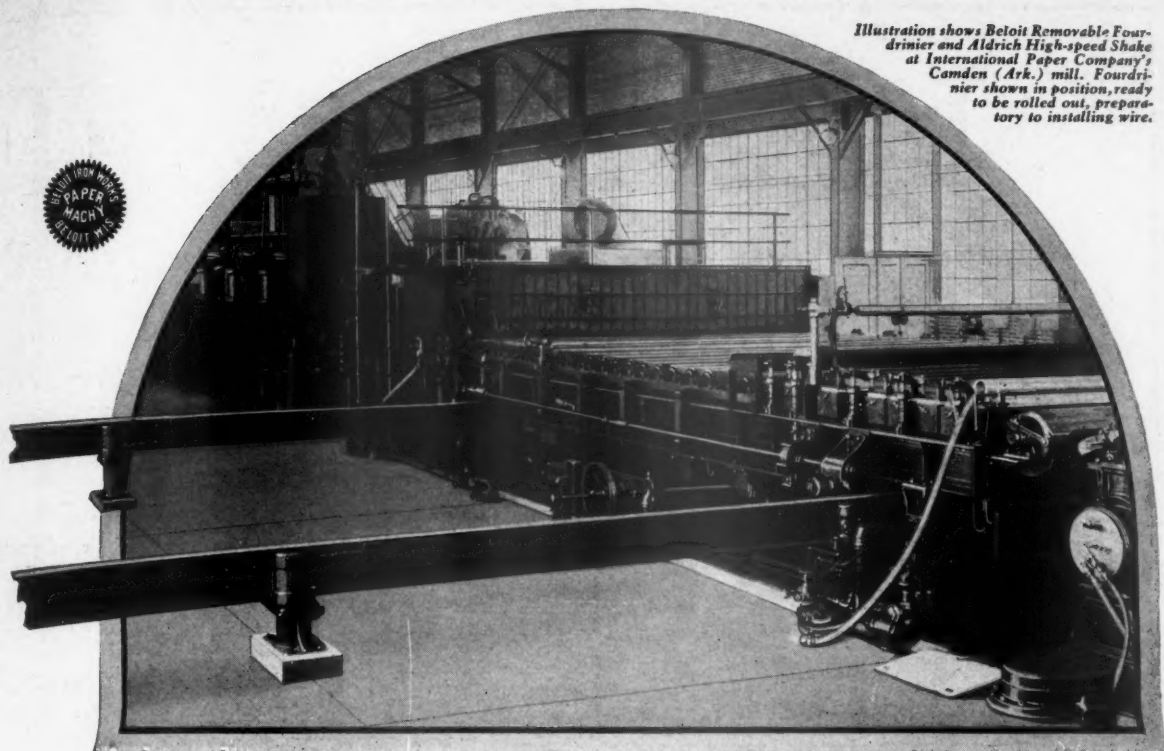
Announce

that on and after February 1, 1929,
their products for the use of paper
mills will be represented on the Pa-
cific Coast by the

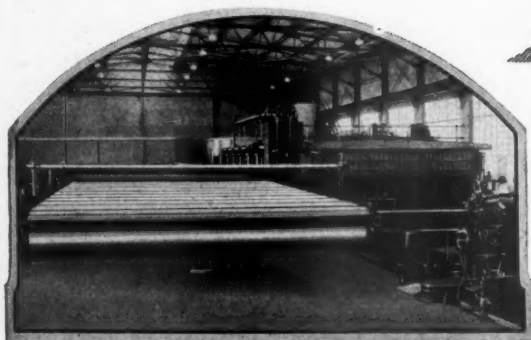
PACIFIC COAST SUPPLY CO.

The continuation of your past inter-
est in Kenwood Products for Paper-
makers is solicited through this new
agency representation.

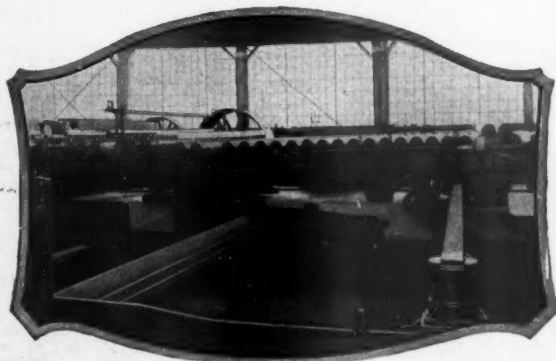
Illustration shows Beloit Removable Fourdrinier and Aldrich High-speed Shake at International Paper Company's Camden (Ark.) mill. Fourdrinier shown in position, ready to be rolled out, preparatory to installing wire.



21 advantages of the removable Fourdrinier



Showing entire Fourdrinier part rolled out by power as a complete unit, making changing of wires a quick, simple and easy operation.



View from rear of machine after the Fourdrinier has been rolled out. Note ease of accessibility. After wire is installed, Fourdrinier is rolled back into position and machine is ready to run.

1. Assures more safety to men.
2. Preserves your most expensive machinery (no necessity for dismantling and reassembling Fourdrinier inside the wire).
3. Permits using necessary savealls full wire length.
4. Requires no handling of savealls.
5. Requires no handling of suction boxes.
6. Requires no handling of breast roll.
7. Requires no handling of table rolls.
8. Requires no handling of bearings.
9. No danger of table or wire rolls being bent, dented or damaged.
10. Prevents crimping of new wire while being put on.
11. No extra crew required to put on wires.
12. No "Cigarette Holder" or crane used with Beloit Cantilever Suction Couch.
13. Preserves the necessary true and perfect alignment of running parts and rolls.
14. Entire Fourdrinier rolls out as a unit.
15. Eliminates all heavy, back-breaking straining and lifting.
16. Makes the workers happier.
17. Saves hours of time formerly lost.
18. Increases production.
19. Utilizes brains instead of brawn.
20. Saves wages.
21. Saves you money.

The REMOVABLE Way is the MODERN Way

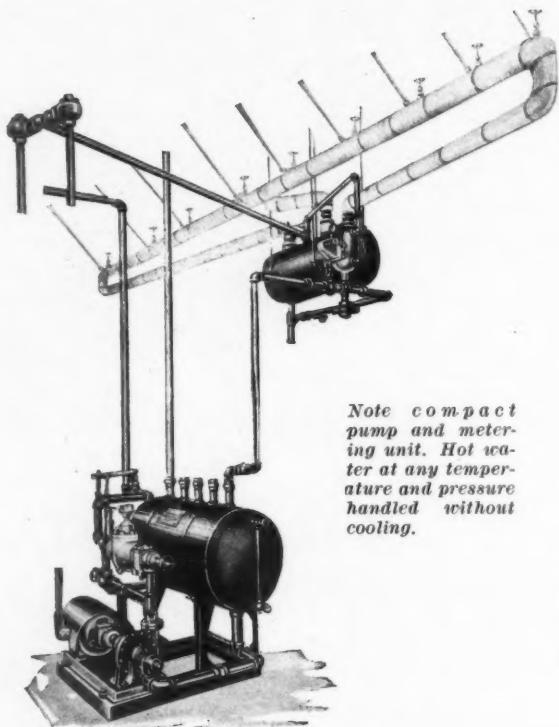
BELOIT IRON WORKS, BELOIT, WIS., U. S. A.

The BELOIT

When writing to BELOIT IRON WORKS please mention PACIFIC PULP & PAPER INDUSTRY

HEALY-RUFF

SAINT PAUL,

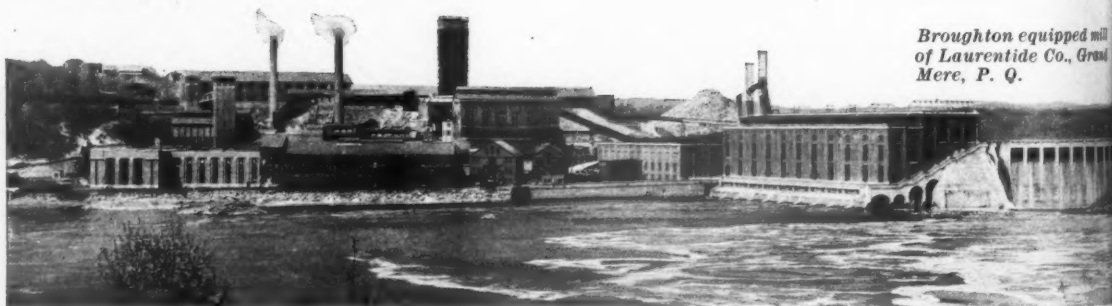


Note compact pump and metering unit. Hot water at any temperature and pressure handled without cooling.

The ideal system for paper machine dryer drainage should include the following features—

- Extreme flexibility.
- Lowest possible steam consumption.
- Complete evacuation of both air and water.
- No cooling water necessary to handle condensate.
- All condensate accurately metered by volume.
- Complete separation of exhaust and live steam.
- Operating pressures uniform throughout or varying at will.
- Greatest possible heating surface released for drying.
- Installation easily made without shutting down machine.
- Continuous, non-depreciating, troubleless operation.

The Broughton system meets every one of the above demands. There is a Broughton system for every paper machine. Detailed information gladly sent without obligation.



Broughton equipped mill of Laurentide Co., Grand Mere, P. Q.

Photo courtesy Fairchild Aerial Inc.

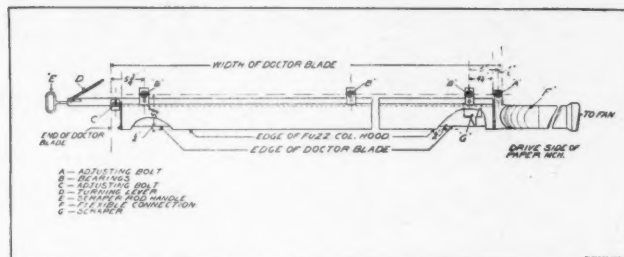
BROUGHTON SYSTEM for *Paper Machine Dryer and Drainage*

When writing HEALY-RUFF Co. please mention PACIFIC PULP AND PAPER INDUSTRY

F COMPANY

MINN., U. S. A.

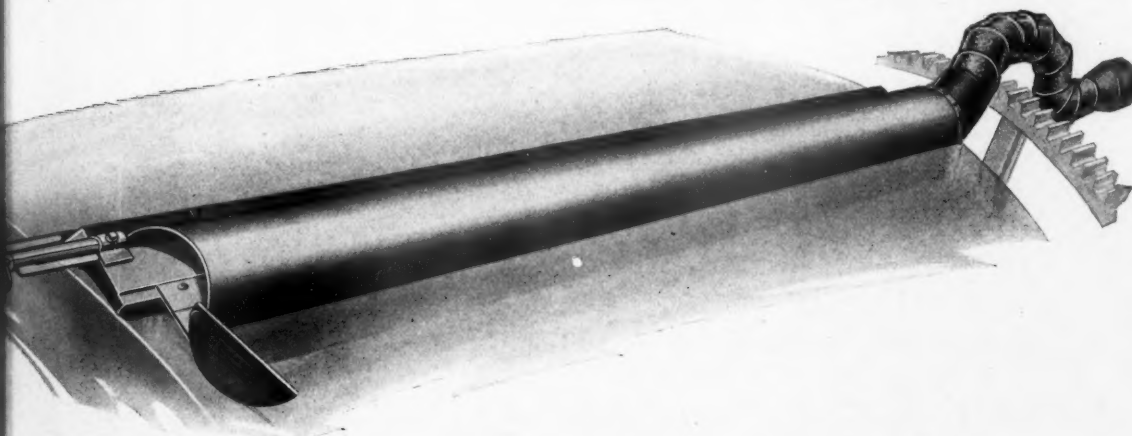
The equipment shown here insures constant removal of all fuzz, dirt, and scale that is skinned from the Dryer by the Doctor Blade. Its installation permits continuous operation of the Doctor Blade, resulting in polished dryers, more even drying decreasing operating pressure, better finish, decreased fire hazard and less work for machine crew. It removes all material constantly skimmed from the dryer by the Doctor Blade.



Compactness eliminates interference with machine operation. Can be installed in two hours or less. Comes complete with flexible connection and exhausting unit.



Impossible to plug this device with wet broke. In event of wet end dryer break, paper skinned off blade and automatically lifts hood to position shown above.



BROUGHTON FUZZ COLLECTOR

FOR PAPER MACHINE DOCTOR BLADES

When writing HEALY-RUFF Co. please mention PACIFIC PULP AND PAPER INDUSTRY

PERKINS-GOODWIN COMPANY

Established 1846

551 FIFTH AVENUE, NEW YORK



AGENTS FOR
PULP-PAPER
MILLS



SOLE SELLING-AGENTS
FOR
SPAULDING PULP & PAPER CO.
NEWBERG, OREGON

A New Tag Design—but the same Trade Mark

on the threshold of its 38th year in designating Appleton Felts



IN the future Appleton Felts and Jackets will have attached to them tags like the one shown above.

The Appleton Trademark continues to be the mark of quality and service — now beginning 38 years of service to paper mills.

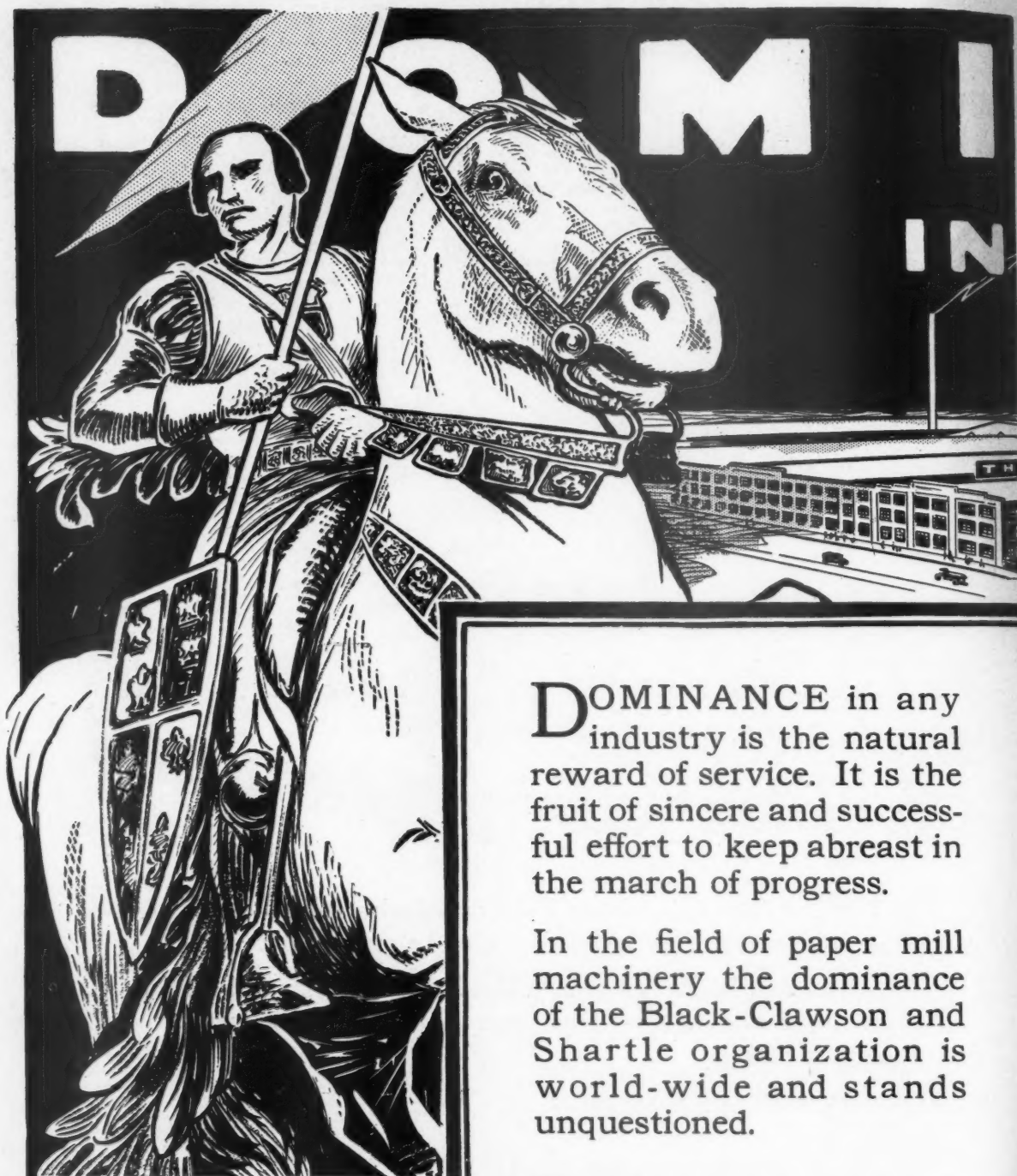
Your inquiry is solicited.

APPLETON WOOLEN MILLS
Appleton, Wisconsin

WALTER S. HODGES
West Coast Representative
408 12th St.,
Portland, Oregon

Appleton
Felts and Jackets

When writing APPLETON WOOLEN MILLS, please mention PACIFIC PULP AND PAPER INDUSTRY.



DOMINANCE in any industry is the natural reward of service. It is the fruit of sincere and successful effort to keep abreast in the march of progress.

In the field of paper mill machinery the dominance of the Black-Clawson and Shartle organization is world-wide and stands unquestioned.

BLACK-CLAWSON

VERTICAL DRYERS — CHAMPION FOURDRINIERS

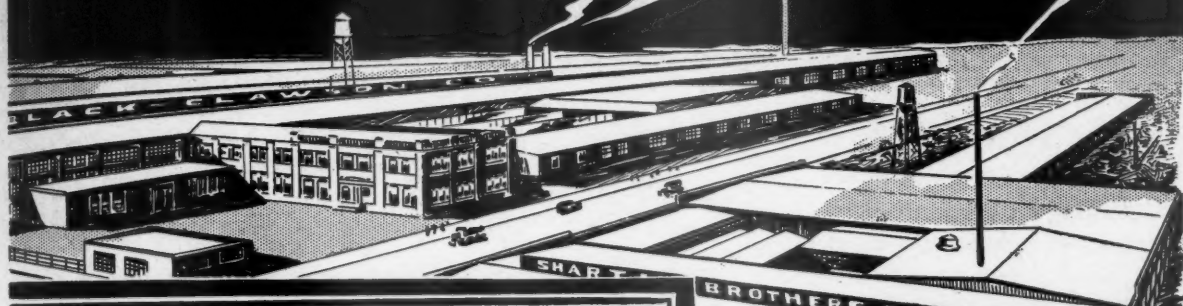


HAMILTON, OHIO

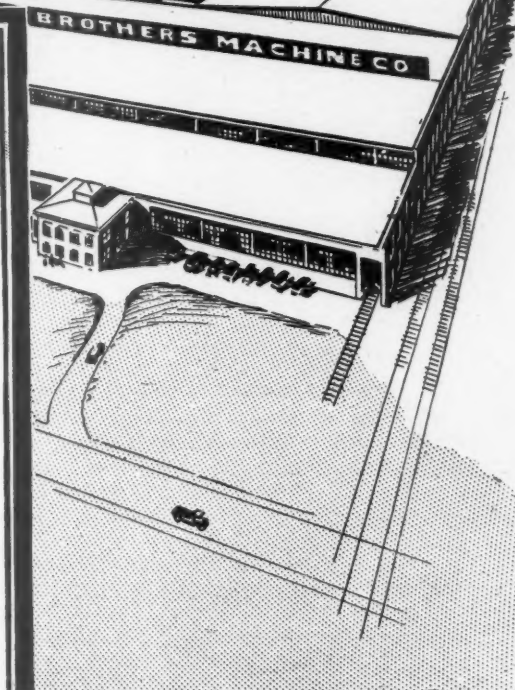
When writing to BLACK-CLAWSON Co. please mention PACIFIC PULP & PAPER INDUSTRY

N A N T

THE INDUSTRY



THROUGH no other single organization can you fill your requirements for practically all machinery necessary in the manufacture of paper, thereby centering in one outstanding company the responsibility for the successful operation of your equipment.



SHARTLE BROTHERS

DIVISION OF THE BLACK-CLAWSON COMPANY

MIDDLETOWN, OHIO



When writing to SHARTLE BROS. MACHINE CO. please mention PACIFIC PULP AND PAPER INDUSTRY

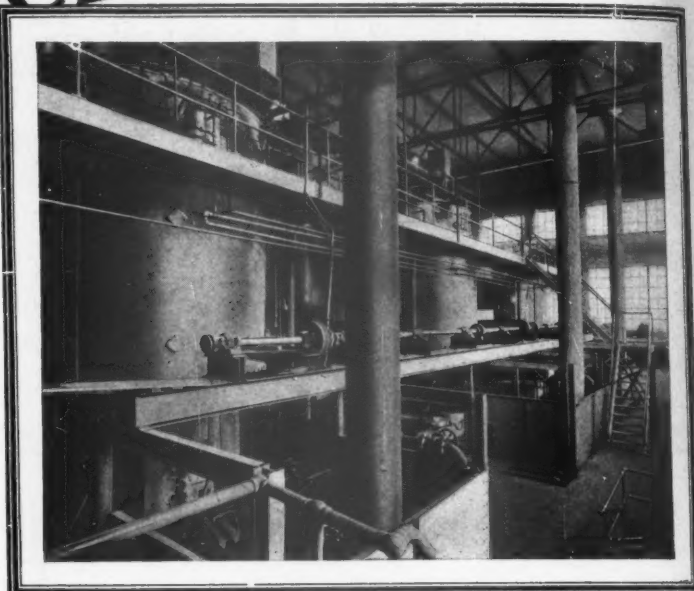
ALBERENE FURNACE LININGS

*An installation of
Wagner Furnaces
in which Alberene
Furnace Linings
are used*



Among the Large Users of Alberene Furnace Linings Are:—

Advance Bag & Paper Company
Bathurst Company, Ltd.
Bogalusa Paper Company, Inc.
Brompton Pulp & Paper Co., Ltd.
Brown Paper Mill Company, Inc.
Canadian Cellulose Company, Ltd.
(Soda Mill)
Central Paper Company
Champion Fibre Company
Crown-Willamette Paper Company
Dryden Paper Company, Ltd.
E-Z Opener Bag Company
Falls Manufacturing Company
Filer Fibre Company
Longview Fibre Company
Minnesota & Ontario Paper Co.
Nekoosa-Edwards Paper Co., Inc.
Ontonagon Fibre Company
Southern International Paper Co.
Southern Paper Company
St. Helens Pulp & Paper Company
Thilmany Pulp & Paper Company
Tomahawk Pulp & Paper Company
Vancouver Kraft Mills
Wausaw Sulphate Fibre Company
Wayagamack Pulp & Paper Co., Ltd.
Yellow Pine Paper Mill Company
Union Bag & Paper Power Corp.
(Plant Under Construction)



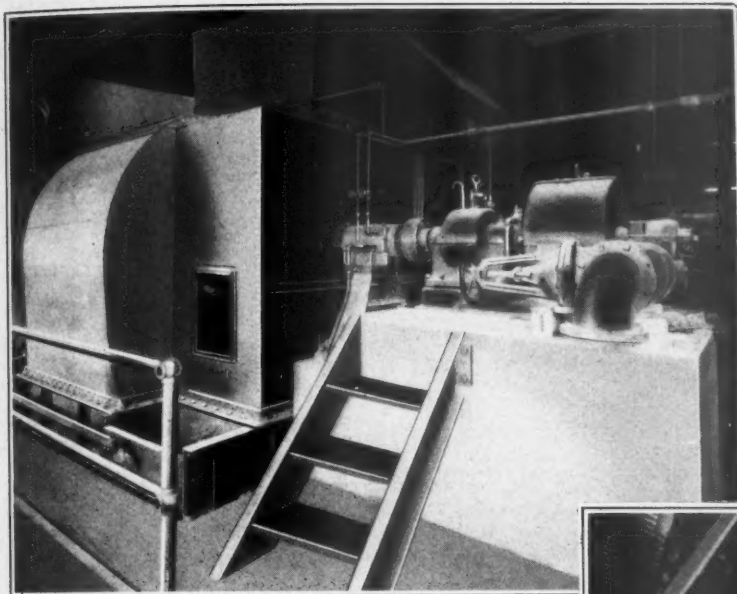
STANDARD FOR NEW FURNACES AS FOR OLD TYPES

Alberene Stone—because of its high compressive strength, low coefficient of expansion, and high chemical resistivity—continues to be the most satisfactory material for furnace linings. Since the advent of the black ash smelter, no manufactured material has duplicated the physical and chemical properties of Alberene. The partial list of mills using Alberene, here given, proves its wide-spread acceptance as the standard material for the purpose. Let our engineers work with you.

ALBERENE STONE COMPANY

153 WEST 23rd STREET, NEW YORK, N. Y.

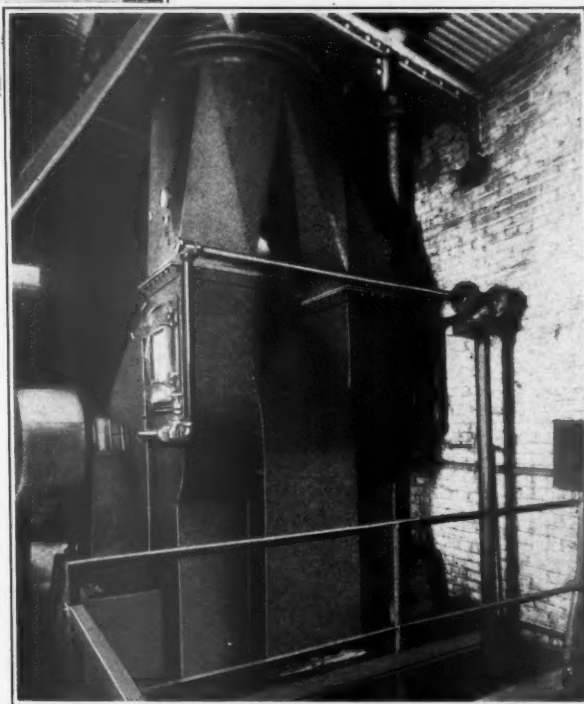
for Cinder and Dust Elimination



Four Buffalo Cinder Eliminating Induced Draft Fans each handling 125,000 cubic feet of hot gas per minute from stoker fired boilers.

Buffalo

**Cinder Fans
and
Centrifugal
Washers**



A centrifugal scrubber also serving as a booster fan—successfully removing 97 per cent of dust from closed mill powdered coal system.

CINDER and dust collection, vitally important in the paper mill of today, is handled with excellent results by the Buffalo equipment illustrated here. Dust elimination problems particularly require experienced engineering ability, and Buffalo engineers have had more than the usual amount of experience in practical development of equipment for this service.

Three branch engineering offices located in Seattle, San Francisco and Los Angeles are ready to work with you on any problem involving the handling or tempering of air. Why not call them in?

Buffalo Forge Company

185 Mortimer St., Buffalo, N. Y.

In Canada:

Canadian Blower & Forge Co., Ltd.

WESTERN BRANCHES:

Seattle Office—303 Alaska Building.

Portland Office—301 Byers Building.

Los Angeles Office—1224 S. San Pedro St.

San Francisco Office—1006 Flatiron Bldg.

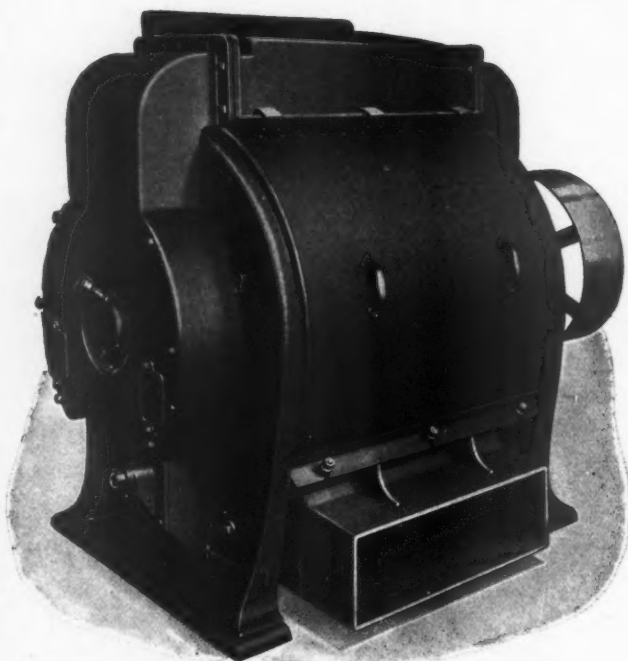
"Buffalo"

Equipment for Paper Mills--
Mechanical Draft Apparatus—Heating and
Ventilating Equipment—Unit Heaters

When writing BUFFALO FORGE CO., please mention PACIFIC PULP AND PAPER INDUSTRY.

REED-SPAFFORD

Pulp Screen

For Ground Wood, Sulphite, Soda or Kraft Pulp

Built in Two Sizes

A Large Number
of Reed-Spafford
Pulp Screens
Are in Daily
Operation in
Pacific Coast
Pulp Mills

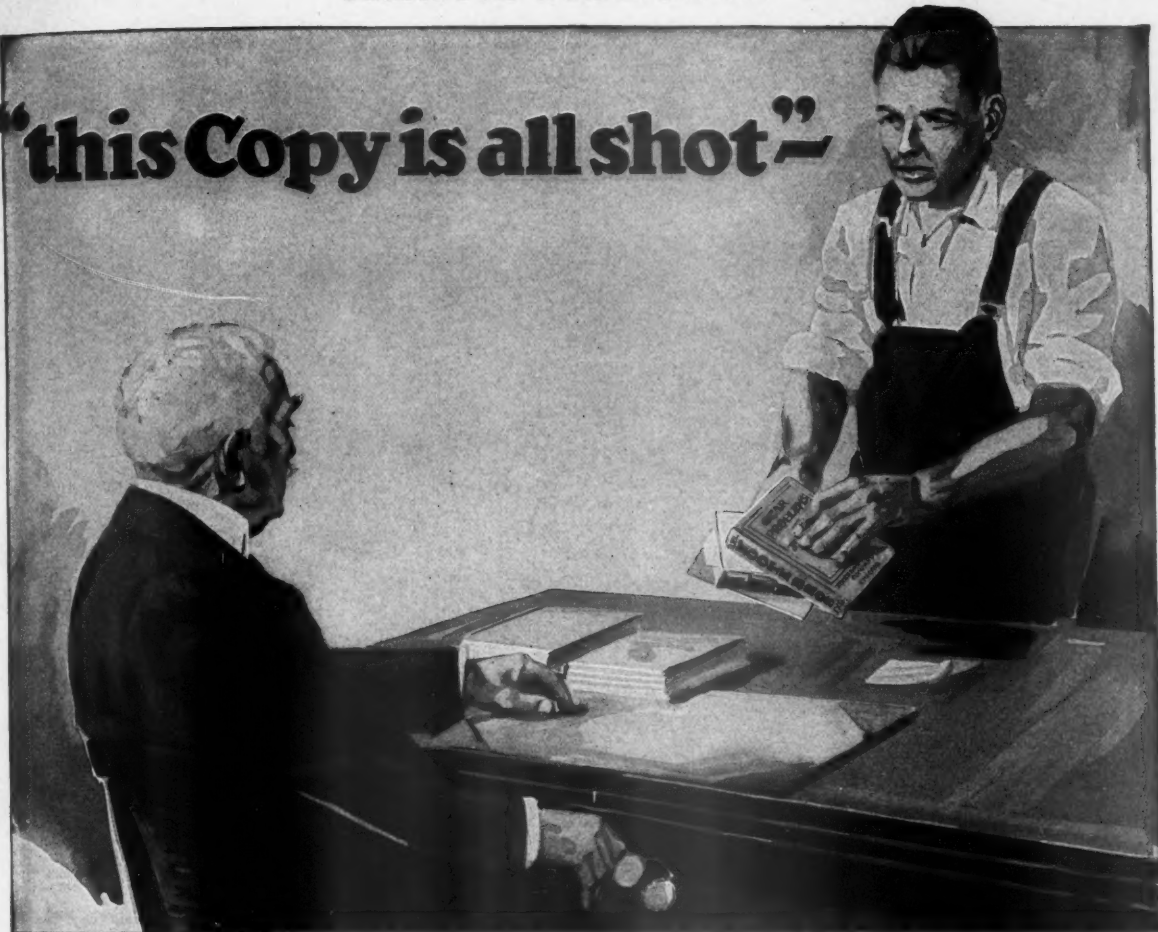
The REED-SPAFFORD PULP SCREEN is remarkably efficient. Its capacity is large and its power consumption is surprisingly low. Let us show you what a saving this screen means to you.

Improved Paper Machinery Company

NASHUA, N. H., U. S. A.

SHERBROOKE MACHINERY CO., Limited
SHERBROOKE, CANADA

"this Copy is all shot"



"Foote Bros. will be glad to give you a new one but fix up the cover on that one, and pass it along to one of the boys. It's full of valuable, instructive information."



661 pages of price information, tables and formulae, and practical problems, with 200 pages of engineering data, indexed and cross-indexed for your convenience



Established 1859

Many companies are using this book as standard for their engineering information on gears, speed reducers and power transmitting equipment.

If you need extra copies for members of your organization, or to replace worn out copies, clip the coupon and send it in.

If you have any particularly difficult problem to solve, remember that the advice and assistance of our engineering department is at your service, without obligation.

We Manufacture

Speed Reducers
Gears of All Kinds
Flexible Couplings
Friction Clutches
IXL Power Transmission Equipment
Special Machinery
Built to Order

FOOTE BROS. GEAR & MACHINE CO.

264 No. Curtis St., Chicago

WESTERN SALES OFFICES—F. Somers Peterson Co., 57 California St., San Francisco, Calif.; Roy & Titcomb, Nogales, Arizona; National Equipment Co., 101 W. Second South St., Salt Lake City, Utah; Fulton Engineering Co., 620 American Bank Bldg., Los Angeles, Calif.; Pratt-Gilbert Co., Phoenix, Arizona; Woodbury & Wheeler Co., 55 Second St., Portland, Oregon.

When writing FOOTE BROS. GEAR & MACHINE CO. please mention PACIFIC PULP AND PAPER INDUSTRY



IEC-226

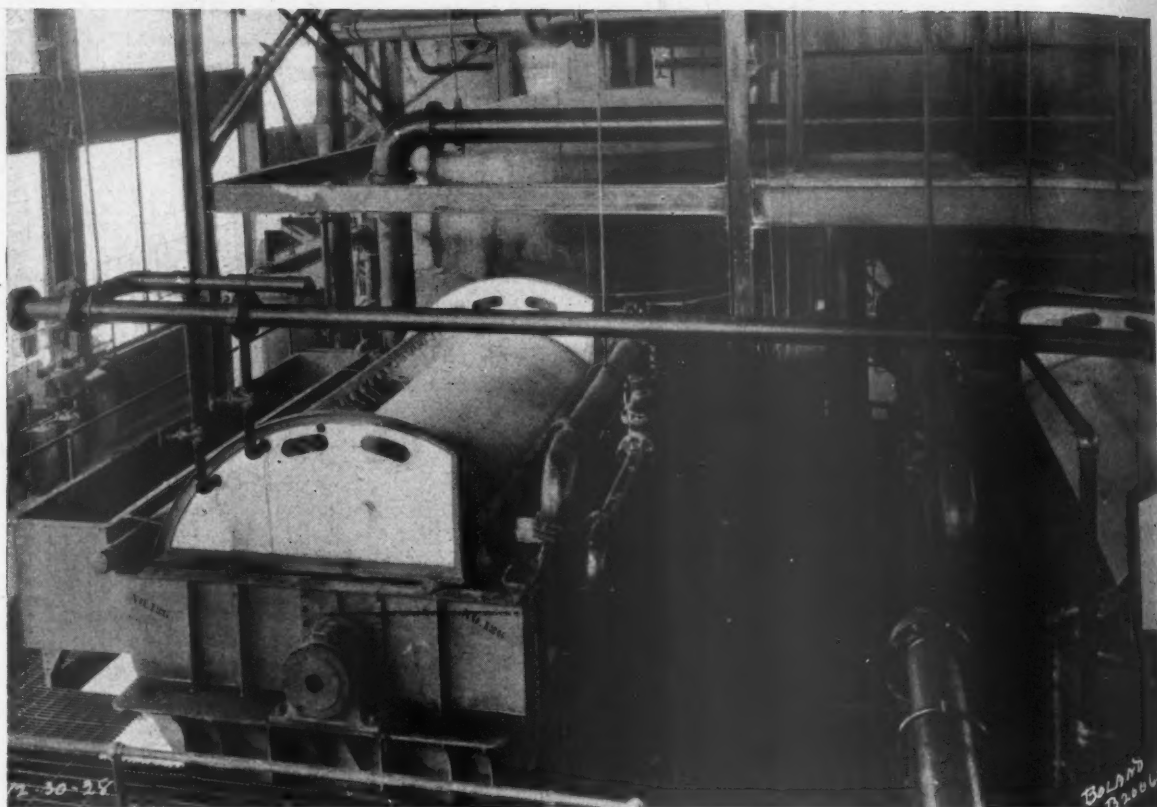
FOOTE
BROS.
GEAR &
MACHINE CO.
254-264 N. Curtis St.
CHICAGO, ILL.

Please send me copy of "Gear Problems"

Signed _____

Address _____

6-28



Here is KRAFT PULP

Union Bag & Paper Power Corporation

IN the new Tacoma Mill of the Union Bag & Paper Power Corporation, five Oliver Continuous Filters are handling the entire kraft washing for this modern plant. Installed to handle the 150 tons proposed mill output, they will easily handle a greater tonnage should the production be stepped up higher.

Three of these five Oliver Brown Stock Washers (6'x10' units) take the pulp direct from the digesters and send black liquor to the evaporators. From this angle, the minimum dilution as provided by Oliver's is a distinct advantage.

*Over 450 Oliver United Units Are
Now in Use in Paper and Pulp Mills*

**Deckers after Screening
Save-alls
High Density before Bleaching
Bleach Washers
Decker Save-all Units**

OLIVER UNITED

Successor to Oliver Continuous Filter Co.

SAN FRANCISCO, Federal Reserve Bank Bldg.—NEW YORK

SALT LAKE CITY, Felt Bldg.

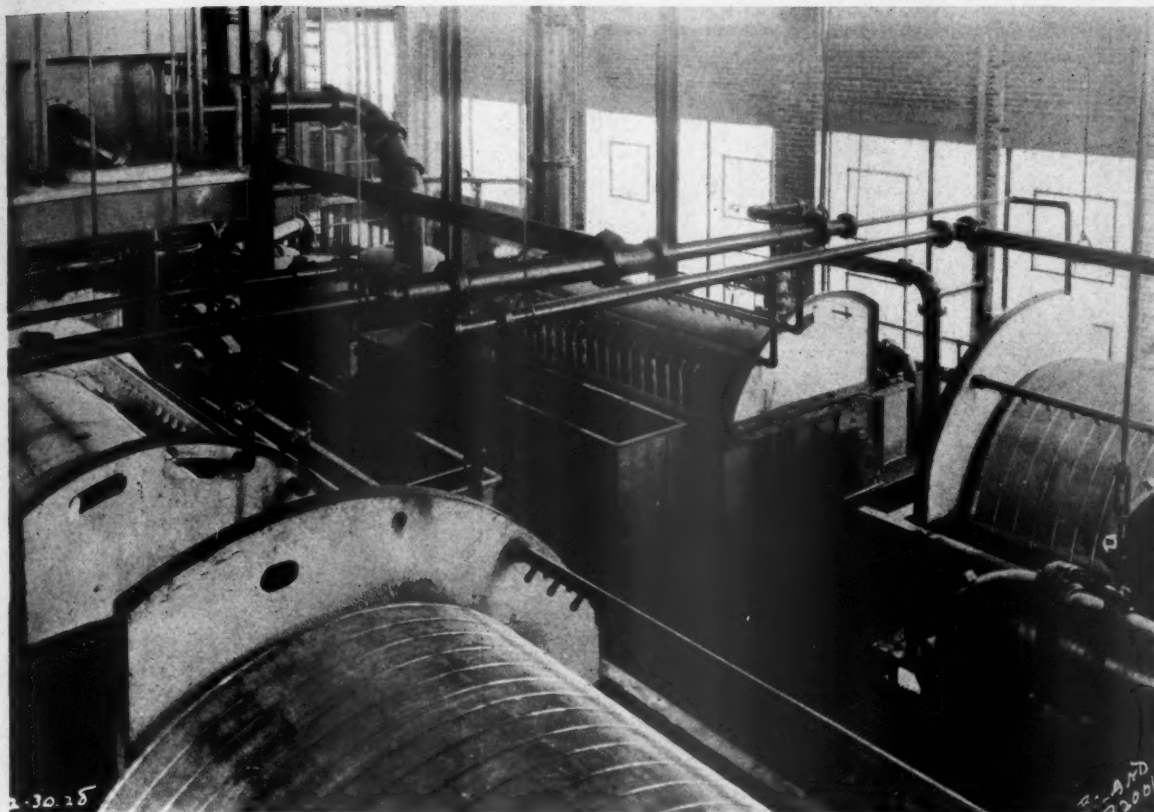
LONDON, 150 Southampton Row, W. C. 1

Johannesburg Tokyo Melbourne Manila

Scheveningen, Holland

Factories—Hazleton, Pa. Oakland, Calif.

When writing OLIVER UNITED FILTERS INC., please mention PACIFIC PULP AND PAPER INDUSTRY



WASHING *at its Best*

Makes Use of Five Oliver Washers

The other two units (8'x10') handle the re-washing and at the same time act as save-alls. By removing the final traces of black liquor, these units are instrumental in eliminating foaming on the screens. They deliver an exceptionally clean pulp.

It is significant that in this modern plant, Oliver Brown Stock Washers were selected for the important duty of delivering clean, thoroughly washed pulp.

FILTERS INC.

and United Filters Corporation.

33 W. 42nd St.—CHICAGO—565 W. Washington Blvd.

LOS ANGELES, Central Bldg.

PARIS, 63 Ave des Champs Elysees

Honolulu Montreal Halle, Germany

Soerabaja, Java

Cable Address: OLIUNIFILT

*Over 450 Oliver United Units Are
Now in Use in Paper and Pulp Mills*

**Brown Stock Washers and
Re-Washers**

Lime Mud Washers

Wet Machine Moulds

Board Forming Moulds

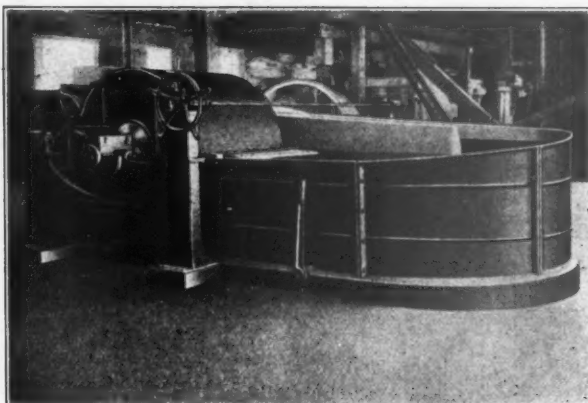
When writing OLIVER UNITED FILTERS INC., please mention PACIFIC PULP AND PAPER INDUSTRY

"Your Paper is made in your Beaters"

NEW TYPE

HIGH DENSITY

BETTER CIRCULATING



THE PROBLEM is "how to beat *more* stock into *better* quality with *less* cost for labor and power."

THE ANSWER is "the Dilts New Type, High Density, Better Circulating Beater, built with high tub and with the roll located toward the rear end."

We could re-
build your
Beaters to
our **NEW**
TYPE de-
sign —

Dilts
MACHINE WORKS, Inc. FULTON, N.Y.
EXPORT OFFICE - 15 PARK ROW - NEW YORK CITY

**SOME
1928 ORDERS**

Ohio Box Board Co.	8
International Paper Co.	12
Gulf States Paper Corp.	6
Oswego Falls Corp.	4
St. Regis Paper Co.	8
Mobile Paper Mills	2
Consolidated Paper Co.	6
And Many Others	

"Your Paper is made in your Beaters"

When writing to DILTS MACHINE CO. please mention PACIFIC PULP & PAPER INDUSTRY



Hawley Pulp & Paper Co., Oregon City.

AGITATOR DRIVES

Eight Falk Reducers with Falk Flexible Couplings are installed on Agitator Drives in the new groundwood mill of the Hawley Pulp & Paper Company.

Falk precision cut herringbone gears, fully enclosed, give smooth transmission of power. They cost less to operate.

Gear Units and Couplings are available for a wide range of applications. They are used throughout the pulp and paper industry for dependable service and maximum efficiency.

*Send for Bulletin 190 containing rating tables
and full dimensions.*

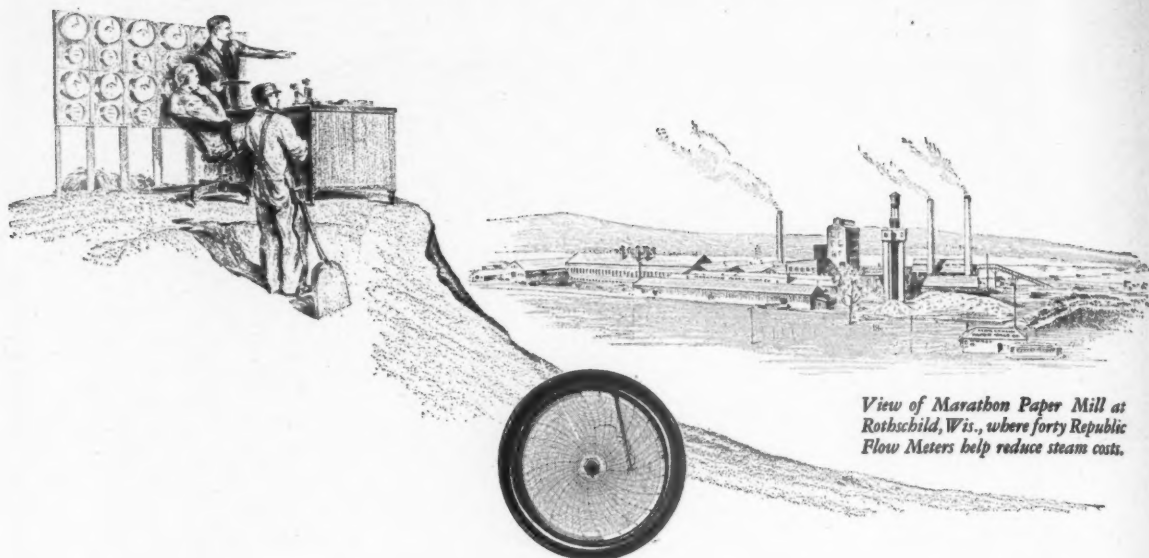
THE FALK CORPORATION

930 Rowan Building
LOS ANGELES, CAL.

333 Market St.,
SAN FRANCISCO, CAL.



When writing THE FALK CORP., please mention PACIFIC PULP AND PAPER INDUSTRY



View of Marathón Paper Mill at Rothschild, Wis., where forty Republic Flow Meters help reduce steam costs.

Come Up on the Hill *with* Republic

GOOD management is a continual war on waste. The successful operation of any plant is dependent upon the economical operation of all departments. Economies in one particular phase of operation are not sufficient to assure the profitable operation of the entire plant.

You have cut your costs on steam production—does this same economy follow through to the various processes using the steam—or does economy end with the boiler room?

Someone must have a hill-top view of the entire field of activity. Someone must co-ordinate the efforts of all departments. Flow meters will provide you with a complete check on the operation of each department. They will provide a complete and accurate record of the generation, distribution and utilization of power in your plant.

Bulletin "Steam Economy" mailed on request

REPUBLIC FLOW METERS COMPANY

Executive Offices and Plant • 2240 Diversey Parkway • Chicago, Ill.

Branch Offices in 25 Principal Cities

DOMINION FLOW METERS CO., Toronto, Canada

ELEKTROFLO, Berlin, Germany

ELECTROFLO METERS CO., London, England



REPUBLIC FLOW METERS



When writing REPUBLIC FLOW METERS CO. please mention PACIFIC PULP AND PAPER INDUSTRY

"M & W" Rotary Screen

*with important
new features*

Divided Diaphragms. Each diaphragm is divided into two sections, which move in opposite directions. The resulting balanced movement avoids all side strain on the cylinder, requires less power, and increases the screening capacity.

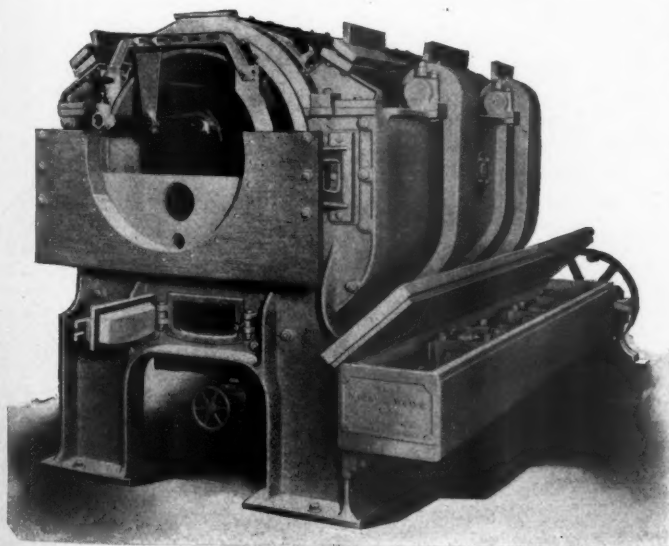
Discharge Openings at both ends of cylinder are much larger.

No Dead Stock in Cylinder. Improved discharge of stock from both ends of cylinder to flow box.

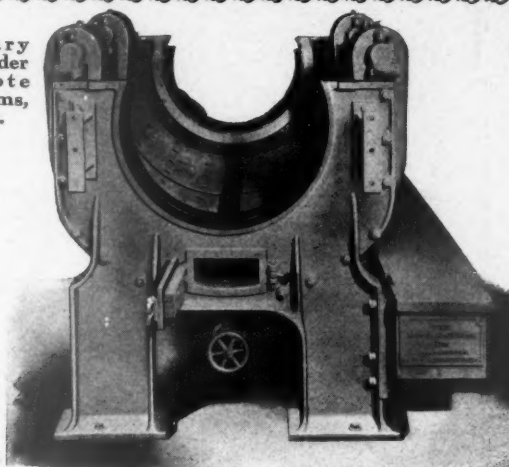
No Dead Stock in Vat. Pockets are prevented by diaphragm action and automatic flushing outlet.

No Packing Troubles. It is impossible for lumps to get into screened stock.

Note enclosed and accessible main drive, showerpipe, washout door for cleaning.



View of Rotary Screen with cylinder removed. Note divided diaphragms, large openings.



The "M & W" Rotary Screen now being placed on the market has been redesigned and built from practical paper mill experience. Recent improvements are fully covered by United States and Foreign Patents.

Self-Oiling Bearings. Shaft bearings and eccentrics are self-oiling, enclosed and protected from water.

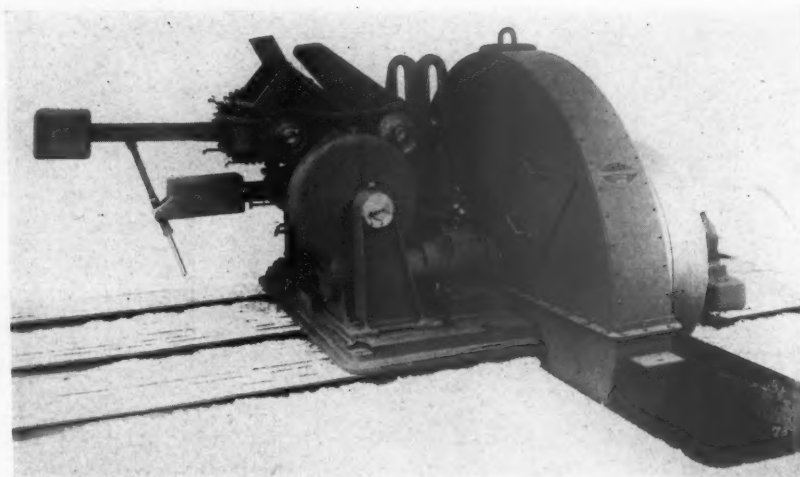
New Shower Pipe—the Moore & White "Criss Cross" pipe that clears the screen plates so effectively.

**Increased Capacity —
Less Power — Reliable
Operation at Low Cost**



WRITE FOR NEW SCREEN BOOKLET

K. M. W. SLAB CHIPPER



THE K. M. W. SLAB CHIPPER

*Makes Sawmill and Box Factory Waste Into Good Quality
Chips for Pulp at Low Cost*

This chipper is especially designed for slabs and edgings and is of the same general construction as the K. M. W. round wood chippers. The spout, however, has a feed arrangement so arranged as to allow the smallest piece of wood to be chipped successfully.

Both of these chippers are guaranteed to make excellent chips with the least amount of power.

Several are now working on this Continent.

G. D. JENSSSEN CO.

200 Fifth Avenue
New York City

*Sole Agents in U. S. A.
For Paper Machinery Limited, Montreal*

1017 White Building
Seattle

HOOKER Chemicals

Caustic Soda
Liquid Chlorine
Bleaching Powder
Muriatic Acid
Monochlorbenzene
Paradichlorbenzene
Benzoate of Soda
Benzoic Acid
Benzoyl Chloride
Benzyl Alcohol
Antimony Trichloride
Ferric Chloride
Sulphur Monochloride
Sulphur Dichloride
Sulphuryl Chloride
Salt

ESTABLISHED in 1903, we have grown from an electrolytic experiment to one of the substantial chemical enterprises of the world. Every product, every process has originated in or passed through our Research Department. We are justly proud of this painstaking care in development and production.

It guarantees you
HOOKER CHEMICALS
of the highest quality.

HOOKER ELECTROCHEMICAL COMPANY

WESTERN
Sales Office:
TACOMA, WASH.
Plant: TACOMA, WASH.

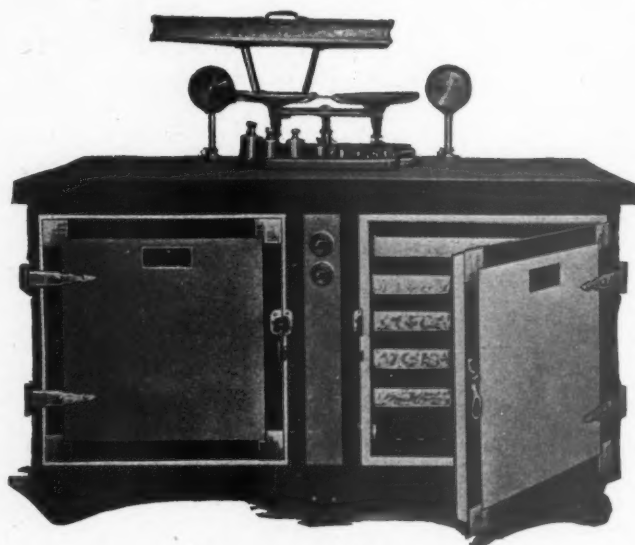


EASTERN
Sales Office:
25 Pine St., New York City
Plant: NIAGARA FALLS, N.Y.

Accurate Equipment for Testing the Moisture of Your Pulp Will Save You Thousands of Dollars

THE WILLIAMS STANDARD PULP TESTING OUTFIT

Conforms in every detail with the Official Method for the Sampling and Testing of Pulp as approved by the Technical Association of the American Pulp and Paper Industry, the Canadian Pulp and Paper Industry, the American Woodpulp Importers Association, etc.



*New Horizontal Model
Work-Table Top, Separate Compartments, Quicker Drying*

FEATURES

OVEN—Double walled, electrically heated, with thermostat control.

SAMPLE TRAYS—Removable for weighing hot samples while covered.

THERMOMETERS—High grade six-inch dial form, one in each compartment.

SCALES—Accurate balances with brass weights, counterpoised tray holder and cover.

It will pay you to write today

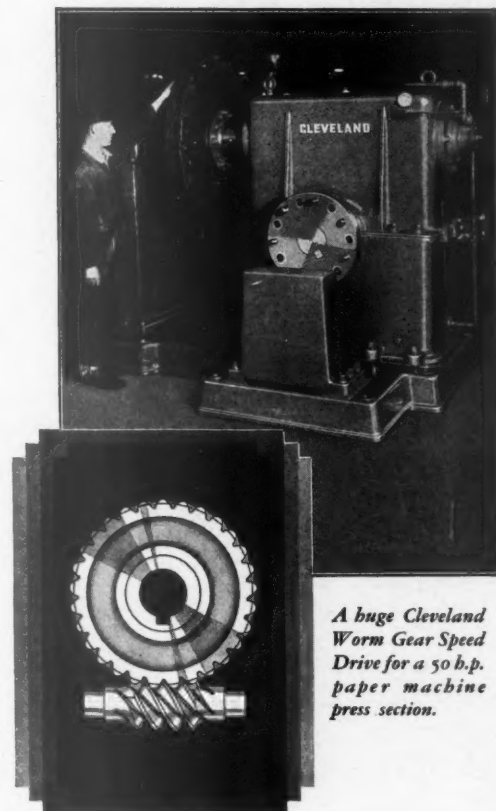
THE WILLIAMS APPARATUS CO., Park Place, Watertown, N.Y.

Why the remarkable trend to CLEVELAND?

OTHER speed reduction units are made and sold at lower prices than "Cleveland." Quite obviously, some feature of unquestioned superiority must be responsible for today's remarkable trend to "Cleveland". . . as evidenced by a steadily increasing number of installations and users.

Briefly, it is due to an almost universal recognition among engineers of "Cleveland's" positive refusal to compromise regarding quality.

For "Cleveland" has been the pioneer, always insisting upon that quality which would give unfailing performance and low maintenance costs. Engineers



A huge Cleveland Worm Gear Speed Drive for a 50 h.p. paper machine press section.

and designers "in the know" turn naturally to "Cleveland" for speed reducers, because "Cleveland" has been the chief source of improved worm gear design for more than fifteen years.

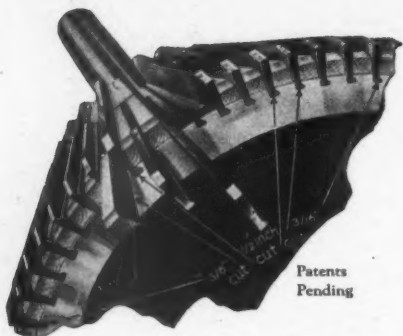
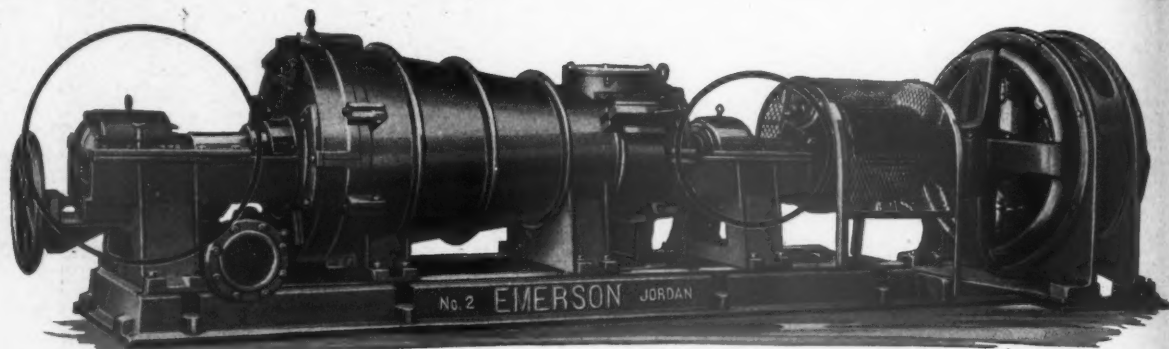
CLEVELAND WORM & GEAR COMPANY

3255 East 80th Street, Cleveland, Ohio

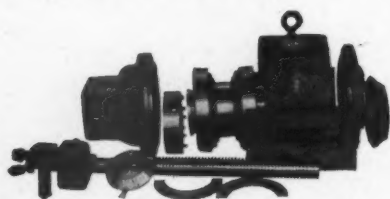
"CLEVELAND WORM GEARING - THE ULTIMATE DRIVE"

When writing to CLEVELAND GEAR & WORM CO. please mention PACIFIC PULP AND PAPER INDUSTRY

The EMERSON JORDAN *equipped with the* Bolton **BANDLESS** Plug



Showing construction of the Bolton Bandleless Plug. Knives and woods cannot come out. **NOTE INVERTED WEDGES.**



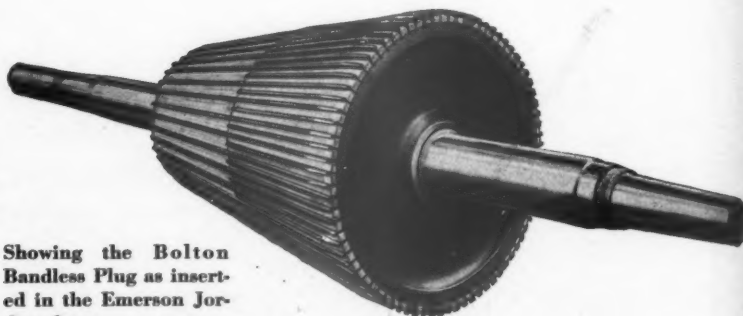
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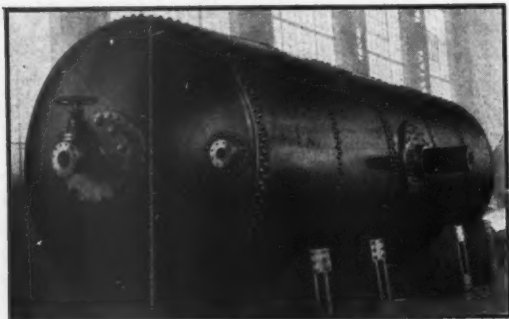
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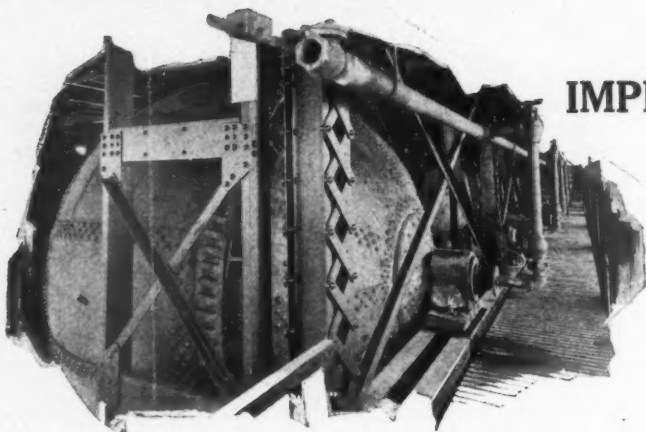
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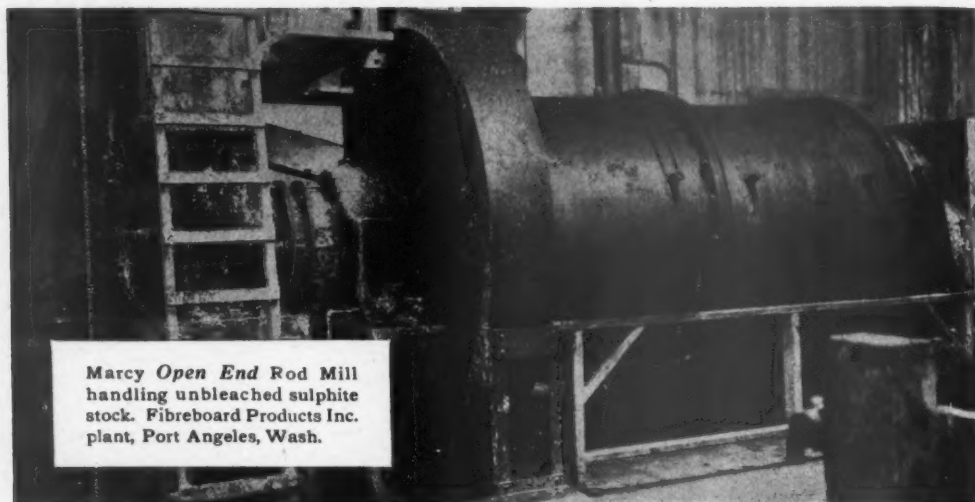
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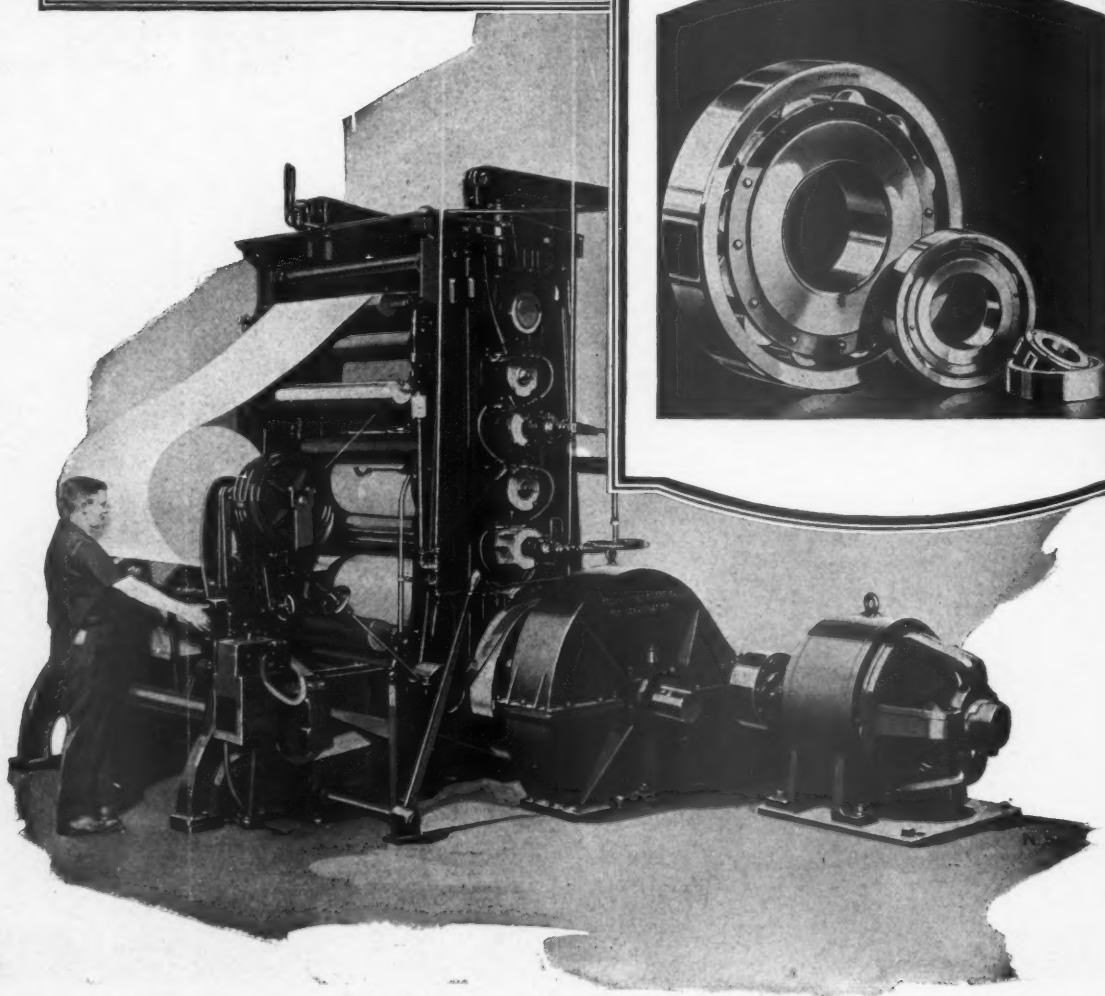
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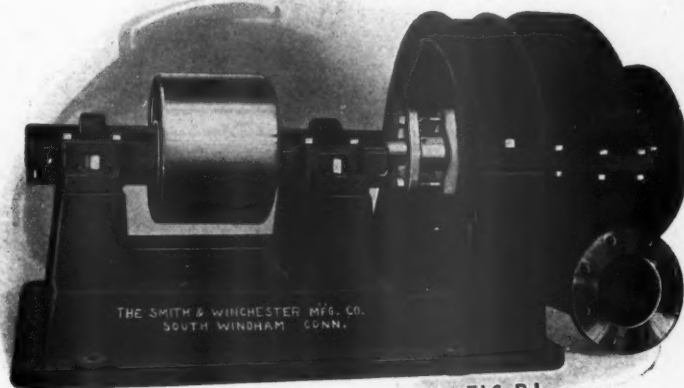
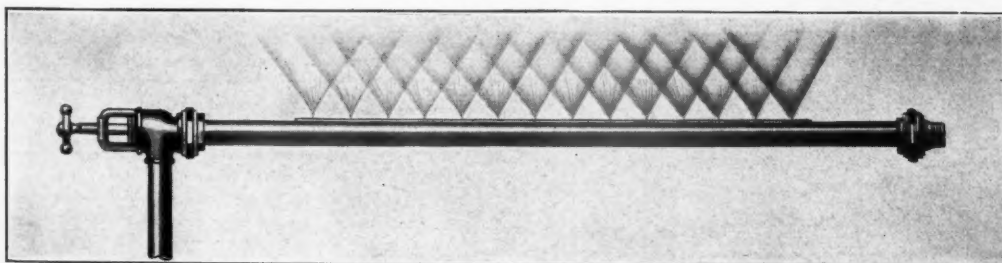


FIG. P.1

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The Undercut Trimmer

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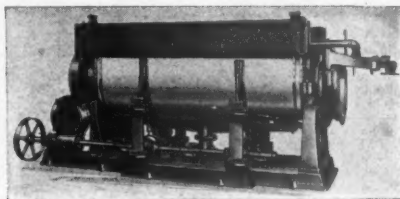
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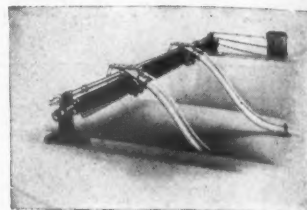
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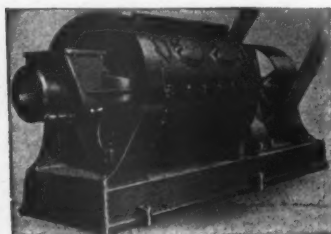
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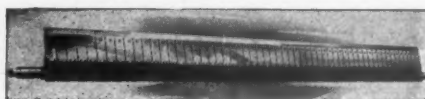
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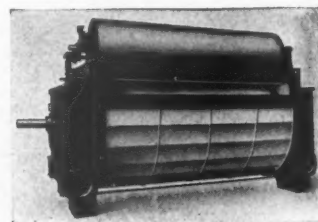


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Annual Review Number

PACIFIC PULP *and* PAPER INDUSTRY

Published By CONSOLIDATED PUBLISHING CO.

SEATTLE, WASH., MARCH 31, 1929

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THE PACIFIC COAST JOURNAL FOR PRODUCERS, CONVERTERS,
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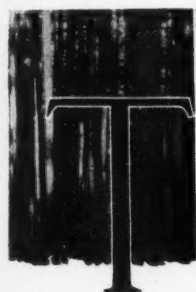
Vol. 3

REVIEW NUMBER, MARCH, 1929

No. 4

Reviewing the Pacific Coast

The Year 1928 Was a Year of Definite Progress



THE year 1929 can be set down in the history of the pulp and paper industry of the Pacific Coast quite definitely as a year of progress. In the industry as a whole the Pacific Coast won a more definite recognition as a steadily growing pulp and paper manufacturing center. In a material way this was evidenced by the entry of some Eastern manufacturing interests into the Pacific Coast field. The transportation companies made acknowledgement to the increasing tonnage of the Coast pulp and paper mills by naming new and lower rates both by water and rail for East-bound movement. Expansion of the industry continued. Mergers featured the year. Foundations were laid for the creation of Pacific Coast section of the Technical Association. Some definite progress was made in the utilization of wood waste. These, in brief, are a few high spots in 1928.

This article will discuss some of the significant happenings of the year on the Coast, but no attempt is made to catalog these happenings in any order of importance. Such ratings are subject to varied opinions, and since the same order would not be concurred in unanimously the present discussion will confine itself merely to recording.

Expansion of the industry continued at a steady rate and the construction either completed or started during 1928 will represent an estimated capital expenditure

in new mills or additions of roundly \$25,000,000. With all this construction completed the Pacific Coast industry will have augmented its daily capacity of all grades of pulp by 890 tons. It will have increased its capacity of all grades of paper by 425 tons. Details of this expansion are covered in another article * devoted to the subject appearing in this same issue.

One of the outstanding achievements of the year was the betterment of both rail and water rates on pulp from Pacific Coast territory to Middle West, Atlantic and Gulf Coast territory. One of the greatest handicaps to the Pacific Coast industry has been the high freight rates which shortened the dimensions of the market. No mere abundance of raw material could equalize a condition of high transportation rates that seriously curtailed the margin between manufacturing costs and net selling price.

The first improvement was made as the year started when the intercoastal conference on January 14 quoted an emergency rate of 30c per 100 lbs. on pulp from Pacific Coast ports to the Atlantic coast on shipments of 250 tons or more suitably baled to a density not exceeding 51 cubic feet per ton of 2000 lbs. The Panama Canal, affording a convenient water route between the two coasts of America made such a rate possible. It might be mentioned at this point that the Panama Canal, a vital factor in the development of the pulp and paper industry of the Pacific Coast, is passing an increasing tonnage every year and that this increase is

*"NEW TONNAGE" on page 41.

putting the industry solidly behind the early construction of a second canal through Nicaragua.

The new \$6 per ton rate on pulp was established as an emergency rate to encourage development of water-haul movement of pulp. The original expiration date of June 30, 1928, has, however, been extended more than once and at the present writing will hold in effect until the end of 1929. The probability of making the rate permanent appears to be excellent, but there is also a possibility that the emergency rate may be removed as there is an indication that the steamship lines will find paper, rather than pulp, a more desirable tonnage. Paper offers an extremely dense commodity, density being a vital factor in computing water rates, and at the same time, being a more valuable commodity, can afford to pay a higher rate, ton for ton, than can pulp. Coupled to this desire for greater revenue on the part of the shipping lines is, of course, the natural desire of a pulp manufacturing company to derive the benefit of complete manufacture—i.e., to make paper rather than pulp—if economically feasible. These circumstances, it is argued, may possibly result in no further encouragement of low rates on pulp, the semi-manufacture, so it is entirely possible that the emergency pulp rate may not be extended.

PULP TONNAGE ADDED TO PACIFIC COAST MILLS—1928

Capacities Stated in Tons per 24-Hour Day

Name of Mill	Location	Mechanical	Bleached Sulphite	Unbleached Sulphite	Sulphate
British Columbia—					
Vancouver Kraft Co., Ltd.*	Port Mellon			110	
Washington—					
Grays Harbor Pulp & Paper Co.	Hoquiam	150			
Longview Fibre Co.*	Longview	20			
National Paper Products Co.†	Port Townsend			200	
San Juan Pulp Mfg. Co.	Bellingham		45		
Shaffer Box Co.	Tacoma		50		
Union Bag & Paper Pow. Co.	Tacoma			120	
Oregon—					
Hawley Pulp & Paper Co.‡	Oregon City	100			
Oregon Pulp & Paper Co.‡	Salem	20			
Sitka Spruce Pulp & Paper Co.*	Empire		75		
Totals		120	170	170	430
Total all grades					890

*Under construction and not completed on Dec. 31, 1928.

†Second 100-ton unit not completed on Dec. 31, 1928.

‡Incomplete on Dec. 31, 1927, but included in 1927 totals. Should be deducted to obtain 1928 net total.

PAPER AND BOARD TONNAGE ADDED TO PACIFIC COAST MILLS—1928

Capacities Stated in Tons per 24-Hour Day

Name of Mill	Location	News	Sulphites	Sulphates	Board	Others
British Columbia—						
Pacific Mills, Ltd.	Ocean Falls			10		
Washington—						
Grays Har. Pulp & Paper Co.*	Hoquiam		50			
Longview Fibre Co.	Longview			35		
National Paper Products Co.	Port Townsend			200		
Oregon—						
Hawley Pulp & Paper Co.†	Oregon City	120				
California						
California Fruit Wrapping Mills	Pomona		10			
Totals		120	60	245		
Total all grades						425

*Paper mill unit under construction and not completed on Dec. 31, 1928.

†Incomplete on Dec. 31, 1927, but included in 1927 totals. Should be deducted to obtain 1928 net total.

The new rate of \$6 per ton represented a cut of \$1 per ton from the old quotations. To a 100-ton pulp mill, producing annually 30,000 tons of pulp, assuming all shipments to go by water, this is equivalent to an annual saving of \$30,000.

A most important factor in connection with this minimum rate was that it required the shipment bales of pulp to be compressed to a density not exceeding 51 cubic feet per ton of 2000 lbs. This element brought up some problems of baling which had hitherto been indifferently regarded. A density of 51 cubic feet per ton is not in itself difficult to attain, but to attain it on an economical production basis is something else again. This problem of baling drew the attention of pulp manufacturers, shipping companies, and machinery builders and resulted in the development during the year of a new type heavy-duty mechanical press. This press is described more fully in another article * in this issue dealing with the technical progress of the year.

Railroads Recognize Growth

Attention on rail rates was first focused on the discriminatory handicap levied on Coast pulp on the back-haul from Atlantic ports to inland mills. An expose of this condition, wherein domestic pulp from the Pacific Coast was forced to pay a back-haul rail rate averaging \$1 per ton higher than European pulp landed at the Atlantic ports, published in the May, 1928, issue of PACIFIC PULP AND PAPER INDUSTRY, aroused a considerable interest in the general matter of rates. This discriminatory differential of \$1 in favor of foreign pulp multiplied the handicaps on Coast pulp in view of the fact that the Coast product already had a water haul charge of \$6 on it when landed at an Atlantic port, whereas the European pulps, coming over in foreign bottoms, paid a rate which ordinarily did not exceed \$4.50.

It became apparent that the Coast pulps would have to look for an all-rail route into the prized Middle West territory. The railroads, forced to recognize the growing importance of pulp tonnage originating on the Pacific, made their first concession in June when at a meeting of transcontinental lines in Chicago the all-rail rate, Pacific Northwest to groups D, E and F (essentially Wisconsin and Chicago territory) was lowered from 65c to a new mark of 60c per 100 lbs. This reduction meant a saving of \$1 per ton to the Coast mills and placed the rates into this territory on a line with those previously conceded into Minnesota territory.

Further Rate Victories

This first successful rate skirmish was followed by a second victory a few months later when the transcontinental lines cut the all-rail rate into Michigan and Ohio territory from 70c to 65c per 100 lbs. The Pacific Coast industry has not been inclined to concede these new rates as final, but regard them, rather, as merely a step in the right direction.

Meanwhile some interest has been evidenced in the possibility of shipping pulp by way of the Panama Canal to New Orleans and thence up the Mississippi and Ohio rivers to the paper mills of the Ohio territory. The Longview Fibre Co. did make at least one experimental shipment upstream from the Gulf terminal. Executives of the government-operated Federal Barge Line looked into the question during the year and some progress was made. Barge-rail rates from New Orleans to Cincinnati, Ohio, and similar terminal points of 33c were

*"TECHNICAL PROGRESS" on page 54.

quoted as a result of this aroused interest, and before the year closed an all-rail rate of 29c on pulp to these points was quoted. Carriers are still working on this route, firmly believing that a share of the tonnage can be induced to move over it and it is quite possible that the year 1929 will see improvement in this direction.

Coast operators have pointed out that there is a time element to be considered in using the Gulf-river route and that capital is tied up in the shipment while it is enroute. Allowance must be made for this factor and rates sufficiently attractive to offset it must be offered before such tonnage can be attracted to the southern route.

The matter of equitable freight rates is a vital thing for the future of the Pacific Coast industry. The wood is here and the manufacture of it into pulp and paper will take place here, but the great population centers are still in the East and the mills of the Pacific must seek their greater market in the Atlantic. Therefore, better rates are justifiable in view of an increasing tonnage.

Technical Interest

To leave now the subject of freight rates, which have their effect in widening the markets for Pacific Coast pulp and paper, we may point to another important development of the industry during the year which looks toward the bettering of the product which is destined to take advantage of those better rates.

The steady development of the industry on the Pacific Coast has tended to bring to this section a considerable number of technical men who are deeply interested in the technical problems of production. Many of these men have come out to the Coast after serving many years in mills in the older producing regions of the Middle West, New England or Canada. Others have "grown up with the industry" here on the Coast. In any case, the men have to meet and solve production problems presented by conditions peculiar to the Coast. This has developed a need and a tendency to exchange knowledge, but there has existed no convenient organ by which such interchange of experience might be effected.

First Pulp and Paper Conference

Sensing this definite desire Dr. H. K. Benson of the Department of Chemistry of the University of Washington extended a general invitation to attend a pulp and paper conference at the university on October 26, 1928. This was the first meeting of its kind ever attempted on the Pacific Coast and the excellent and representative attendance strongly indicated that meetings of this nature were definitely in demand. A number of valuable papers were presented at the conference and the meeting closed with a banquet and informal session following, at which Dr. Benson was continued as chairman and instructed to call a committee meeting for the purpose of shaping plans for the formation of some form of permanent Pacific Coast section of a technical association. The opinion expressed on October 26 favored formation of a section of the Technical Association of the Pulp and Paper Industry (TAPPI). An executive committee of twelve representatives from Coast mills subsequently met on January 14 and formally petitioned TAPPI to organize a Pacific Coast section. The feeling for some special form of organization was voiced owing to the geographical distance separating the Coast region from the other paper and pulp manufacturing centers. Since that meeting the national body of TAPPI has moved official-

ly to organize the Pacific Coast section and plans are now under way to complete the organization during the present summer or early fall.

Creation of a Pacific Coast technical section involved its difficulties. It was a pioneer step. It was necessary to tread on new ground. The comparatively small number of mills on the Pacific Coast prevailing up to recent years has offered little inducement to create a technical section and the distance separating the Coast mills from



DR. H. K. BENSON

Initiated first Pacific Coast Pulp and Paper Conference

other regions has not served to create a habit of co-operating. There was some feeling that nothing was to be gained through meetings. With the industry rapidly expanding, however, and with new mills and new men swelling the Coast ranks steadily and rapidly, the benefits of organization are becoming more generally recognized. The representative attendance at the October conference and subsequent committee meeting was very encouraging, although the aloofness of some of the most prominent companies was quite conspicuous.

One very interesting development during the year was the entry of the Hammermill Paper Co. interests into Pacific Coast territory. The name "Hammermill" has been so extensively advertised that it has come to be, in the minds of average business men, synonymous with paper. Thus it was that for a company as well known as the Hammermill company to transfer a part of its manufacturing activities to the Coast was of prime significance. It meant a recognition in the industry of lower manufacturing costs on the Coast due to more abundant wood supplies. It meant recognition of the fact that Pacific Coast woods could produce pulp of high quality. This may seem to be a superfluous statement, yet it is true that a propaganda has been perpetrated in past years that Pacific Coast woods were inferior and could not meet the demands of the better

grade papers. This belief is today "blown higher than a kite," but for a long time it was an excellent sort of propaganda for those who had no desire to see a pulp and paper industry build upon the Pacific Coast.

As is stated in the article in this issue dealing with mill expansion in 1928 the Hammermill interests joined with the Zellerbach interests on the Pacific Coast and formed a new and distinct company which was neither Hammermill nor Zellerbach, but comprised of individuals of both, and known as the Grays Harbor Pulp & Paper Co.

This company is now constructing a 50-ton paper mill unit at Hoquiam, Wash., for the manufacture of the well-known line of Hammermill bond papers and will draw its pulp requirements from the 150-ton bleached sulphite pulp mill unit of the same company. While this 50-ton mill is said to be designed to serve principally the Coast distribution of Hammermill, the strategic tide-water location of the Hoquiam mill makes it able economically to place its paper output in the great markets of the Atlantic Coast. While there is no official confirmation to the thought, the belief persists in the trade, however, that the Hoquiam mill will eventually produce the bulk of Hammermill requirements.

Significance of Move

The addition of a single 50-ton paper mill to the Pacific Coast is not the most important phase of Hammermill's westward move. The important thing is that when such a well known paper company makes a move of this nature the interest of the entire industry as well as the general public is aroused. The executives of other paper companies are stirred to think, "What is there for me on the Pacific Coast?" and the average Pacific Coast citizen of the Pacific Coast section also perks up his head and says to himself, "Well, it looks as though we are going to have quite an industry out here."

Another move of significance in this East-to-West trend of the industry was the building of the Union Bag & Paper Corporation's 120-ton sulphate pulp mill on tidewater at Tacoma. This mill was specifically planned to meet the pulp needs of the company in its Eastern paper mills. Rising wood costs had forced the abandonment of pulp mills along the Atlantic. Of course Union Bag's new Tacoma mill is but a 120-ton unit today, but some of the walls are but temporary in nature as compared to the first class and permanent character of the buildings in the main. These temporary walls are but a part of the company's plan to expand the Tacoma mill to 300 tons when the time is right. Further than that there are those who right now are willing to lay a bet that Union Bag will install paper machines at Tacoma before five years have gone by.

Markets Extend Eastward

In connection with this discussion of the Eastern mills moving into the West it is appropriate to discuss another phase, that of the Western mills extending their markets into the East. The rather moth eaten idea that the Coast is to produce those pulps and papers demanded only for local consumption has been discarded. Crown Willamette has been extending its sales field into the Southwest. Sales offices have been established in large Eastern centers. Fibreboard Products during the year established a sales office in Chicago and also purchased the Federal Container Co. in Philadelphia. The Longview Fibre Co. has more recently purchased a container factory in Springfield, Mass.

There have been rumors of other Eastern companies entering the Pacific Coast field. Perhaps no organization has appeared in these many rumors more often than the International Paper Co. "When is I. P. coming to the Coast?" is a question met at every hand. At the close of the year these rumors turned toward British Columbia, but all the powers-that-be have remained sphinx-like. Early in the year the Coast circulated a rumor that there was impending a merger between Crown Willamette Paper Co., and the Zellerbach Corp., the Pacific Coast's two leading companies. I. P. also showed up in this rumor quite often, but President I. Zellerbach of the Zellerbach Corp. made definite denials that Zellerbach had anything to do with International.

Crown Zellerbach Merger

The Crown-Zellerbach rumor refused to be downed however. The San Francisco stock market took on a lively turn early in the year in Crown and Zellerbach stocks, and on March 30 came the official announcement that the two Pacific Coast giants had merged to form an even greater giant, the \$100,000,000 Crown Zellerbach Corp. I. Zellerbach, who had been president of the Zellerbach Corp., became president of the merged organization, while Louis Bloch, who had been president of the Crown Willamette Paper Co. became chairman of the board. The merger brought under one control a vast organization extending the length of the Coast from Los Angeles to Ocean Falls, the most northerly mill in British Columbia. It brought into one organization a group of mills manufacturing a wide variety of papers and board, paper converting and fibre container plants, and a chain of jobbing houses scattered over the Pacific Coast. Crown Willamette has always been essentially a manufacturing organization, while Zellerbach saw its foundation in sales and has always been strong in that respect, only in the more recent years branching off into the manufacturing end. The merger was, then, more than a combination of two companies, it was a merger of sales and manufacturing that established a position of dominance on the Coast.

Mergers Numerous

Culmination of the Crown Zellerbach merger was the climax of some lesser mergers occurring in the previous year. In 1927 the Crown Willamette company had acquired the three plants of the Western Waxed Paper Co. In the same year the National Paper Products Co., a subsidiary company of the Zellerbach Corp., had merged its board and container interests with the Parafine Companies, Inc., to form Fibreboard Products, Inc.

The tendency to consolidate was not confined to the Crown Zellerbach interests. The St. Helens Pulp & Paper Co. purchased the California Bag & Paper Co. of Emeryville, Calif., and moved the plant to a new location adjoining the paper mill at St. Helens. In the paper trade field Blake, Moffitt & Towne expanded its coastwide chain and entered the Seattle field with the purchase of the Mutual Paper Corp., a hitherto "independent" house. There were also other consolidations in the jobbing field. In the paper box field the merger bug also did a little biting with the result that a number of "independent" factories in the San Francisco bay region merged under the name of the Consolidated Paper Box Co. This resulted in the dismantling of some of the older factories and the doubling up of some units to perfect operating economies. As the year closed there were further rumors of more mergers in

the paper box field in California and a strong likelihood that further consolidations would take place.

The day when Alaska will become a paper making center and utilize its vast pulpwood resources is rapidly approaching. Two pulpwood rights are now held in Southeastern Alaska by the Zellerbach interests and by George Cameron, California publisher, and the ultimate proposal is that two newsprint mills with initial daily capacities of not less than 200 tons will be constructed in the near future. Looking toward this development the Zellerbach and the Cameron interests jointly conducted extensive surveys in Alaska during the past year measuring stream flow, cruising timber chances and gathering data on power sites. No plans have been announced as yet regarding actual construction and, in view of the vast amount of engineering data necessary, the work is being continued in 1929.

Expansion Affects Markets

Market conditions in the industry were not too good during the year. The tremendous expansion of the newsprint industry in Canada in recent years has caused a tremor in the industry all over the world. With the let-down of tariff barriers on news print in 1911 and the rapid exodus of the news print industry into Canada following has caused an instability that has not yet run its full course. With news print mills in the United States finding it increasingly difficult to remain on news production, and forced to turn to other grades, the effects of Canada's newsprint pace have been extended to virtually all grades because the market equilibrium has been upset. The Pacific Coast mills are believed to have felt the effects less than mills in other sections of the country. The somewhat isolated position of the Coast mills has tended to disturb its markets at least to a less degree than has prevailed in the Eastern territory. The effects have been felt, however, and when the Southern kraft mills suddenly lopped \$10 off the kraft prices the echo was heard around on the Coast. When International Paper Co. made its now famous news print price cut the Coast news print producers were forced to sit tight along with the rest of them until the thing had been threshed out. The downward revision of prices is reflected to the Coast mills.

The Coast industry apparently operated on a healthy basis during 1928. While figures are not available to show per cent of capacity operation for the Pacific Coast mills it is generally conceded that the Coast mills, on an average, operated at more nearly capacity production than mills in other sections of the country. Some, it is known, operated on virtually a 100 percent basis. In view of the very rapid expansion of the industry on the Coast in the past few years it is encouraging to note that the past year has seen no receiverships and only two small new mills remained idle for a considerable portion of the year. All others maintained continued production.

Wood Utilization Advances

Quite a little has been contributed to the fund of operating knowledge in the past year. Some distinct trends can be noted. The search for more efficient methods that will permit closer utilization of the wood resources of the Coast continues. Opinion seems to be on the point of dividing on the value and feasibility of using waste. In the past two years a number of chipping plants have been established in connection with sawmills to supply pulp mill needs. One large operator now has found that the supply of chips from sawmill waste is not dependable enough to permit basing full

operation upon that source. He is now leaning toward a policy of depending on the sawmill waste supply for only 50 percent of requirements and going back to round wood for the remainder. This does not mean that the sawmills are not producing the quantities of waste as they did formerly, but that sawmill operations are subject to operating fluctuations which severely interfere with the supply of chips. There is very little storage of chips and the waste material moves quite



I. ZELLERBACH

President, Crown Zellerbach Corporation

speedily from the saws in the lumber mill to the digesters. This "reversion to type" is interesting as it indicates a tendency to reverse the thought of yesteryear when sawmill waste was a subject of every grocery store discussion.

The statements preceding should not be interpreted to mean that sawmill waste is being abandoned entirely as a supply. On the contrary, more waste than ever is going into pulp, but operators are learning by experience just where to catalog this source of supply in the matter of dependability. A number of mills on the Coast are operating entirely on waste and their number was increased during the year. The tendency has apparently been, however, to bring the sawmill and pulp mills closer together and at a number of operations waste is conveyed directly from saw to chip storage, bypassing the notorious burners.

On the other hand, further study is being given to the matter of salvaging woods waste. It is realized that a shameful amount of good pulpwood is being permitted to perish in the forest in the path of the logger. The U. S. Forest Service completed during 1928 a woods waste study which was spread over 2½ years. This study revealed the astounding fact that 6,448,000

cords of sound wood of cordwood size or larger were being left in the woods every year in the Douglas Fir region of Washington and Oregon. This is roughly 1,000,000 cords more than the entire amount of pulpwood produced in the United States in 1928. The salient facts of this woods waste study are presented in another article† in this issue.

To determine the amount of woods waste is one thing. How to get that waste out on an economical basis is still another matter. Coast operators are constantly seeking the way out. In this search they have tried logging pulpwood ahead of the main timber cutting. They have tried "cleaning up" after the logger. The perfect answer has not yet been found. The pulp industry is interested in seeing all of the good wood get into chips. One step in this direction was made during the year when a chipping plant was constructed at Neah Bay, Wash., where the Washington Pulp & Paper Corp. had for some time been conducting pulpwood operations, cutting clean and taking the wood out in the form of cordwood. Feeling that this system was involving some unnecessary labor the company during the year constructed a diesel-powered chipping plant at Neah Bay to make chips right in the forest. The experiment is further interesting in that the supply serves a two-fold purpose, that of supplying the sulphite needs of a news mill and that of supplying chips for a kraft mill. The combination appears to be a happy one inasmuch as the second grade chips can be diverted to kraft.

Bark Logs First?

There is another school of thought that holds to the idea of integration of the wood using industries, but insists that the horse is being put before the cart in sawing the logs into lumber first and then attempting to bark and salvage the waste afterward. This school holds that the logs should be barked first and then sawed into lumber. The clean slabs could then be passed immediately to the chippers without employing an excessive amount of hand labor to bark the comparatively small slabs, edgings and other waste. Some equipment companies have conducted rather extensive experiments in perfecting a log barking machine, but no commercial installation has been made to date. The hitch seems to be that the idea is revolutionary and to install the system would involve a rather heavy initial outlay and necessitate the virtual rebuilding of a wood-room. Further, the idea is based upon combination pulp and lumber operations and an additional difficulty presents itself here in bringing these two interests together.

While speaking of waste it is significant to note that at the first pulp and paper conference, previously referred to, discussions of waste had a prominent place on the program. On the same day, meeting in Portland, the nineteenth annual Pacific Logging Congress devoted a major portion of the day to discussions of pulpwood possibilities. Some highly interesting papers were presented and the loggers became acquainted with this new element, pulp, in a better fashion and were told that pulp mills were complementary to lumber mills, not in competition with them. One of the most interesting of the papers presented at that session is published in this issue.*

*Pulp and the Logging Industry, E. T. Allen.

†"Logging Waste for Pulpwood in the Douglas Fir Region"—By Allen H. Hodgson, page 83.

The Pacific Coast is becoming more and more alive to the necessity of some plan of sustained yield for its great resource, the forests. Reforestation is a subject that demands increasing attention and serious discussion on the part of leaders in all the industries resting on wood as a basic raw material. Some of the major pulp and paper mills are now carrying on reforestation programs most earnestly and have rounded out plans whereby their timber lands will be forever producing and be always capable of meeting the incessant demand of their mills for pulpwood. Some of the major lumber companies have also gone in for reforestation.

Forest Taxation Problem

Coupled with this problem of reforestation is of course the question of forest taxation. Taxation seems to be the greatest stumbling block in the path of commercial forest growing. Some ray of light appeared, however, when the Forest Taxation Inquiry, a special branch of the U. S. Forest Service, conducted a taxation study in the Douglas fir region of Oregon and Washington during the year. The timber owners generally cooperated in splendid fashion with the inquiry board and are hopeful of something better for the future.

It is not the intent of this article to forecast. "A prophet is without honor in his own country." But it seems justifiable in closing to ponder for a moment and ask, "What lies ahead for the Pacific Coast?" That further expansion of the industry is in store goes without question. One has but to cast around for the many projects now in some stage of development. Some are pure promotions, but, "like the poor, we have them with us always." But rejecting this promotional fluff we find some of the most experienced men of the industry earnestly studying the Pacific Coast, and even this early in the year sufficient information is at hand to base a statement that the coming year will see a continuation of expansion on the Coast with no abatement and possibly, instead, an acceleration of pace. These newer developments will bring out not only names well known on the Coast but also names which are more familiar in the paper and pulp circles of the Eastern sections of the continent.

Further Research Necessary

Expansion alone does not cover the subject. There is need for further research into markets. There is great need for real research into the problems of manufacture, for we are rapidly approaching the time when absolute technical control will become a necessity and not be considered in the light of a luxury as some have seen fit to view it. The mill that continues to disregard technical control will be shown the handwriting on the wall. And in this regard it should be emphasized that technical progress grows best under a plan that permits an exchange of knowledge. The Coast is making progress in that direction, but there remains some moss to be cleaned off. The public is becoming more pulp-minded, but much remains to be done. With mills investing their millions on the Coast on the hope that the forests are to continue, the public must be made to realize just how important the permanence of the forests is to their economic life and, made to realize it, do something about forest taxation that will permit timber crops to be grown forever.



New Tonnage...

A Review of New Construction Completed or Begun in 1928

COMPARISONS are of no avail unless some yardstick is first determined. It is the purpose of this article to sum up the progress, that is, the new construction which has augmented the daily tonnage of the Pacific Coast pulp and paper industry during 1928 and to compare that progress to some extent with what has gone before. The first step is the selection of a convenient unit by which the comparison might be made. The calendar year is selected as best meeting the purpose, but the historian of industrial progress at once encounters some difficulties even with that convenient and well known chronological yardstick.

Industry is no particular respecter of the calendar, with perhaps the notable exception of the income tax. New programs are launched, carried out and completed with no particular regard for where such programs may fall within the calendar year. In the pulp and paper industry, to be more specific, construction programs extend over many months and the years thus overlap. To come down to a definite basis of comparison, however, the line must be drawn somewhere. Therefore, for the purpose of this article all construction which saw its completion or beginning within the year 1928 will be discussed as the events of that year.

With this preliminary discussion of the rules disposed of one can proceed to the real meat of the subject.

New Capital Invested

Summing up, it is found that some \$25,000,000 of additional capital was invested in the pulp and paper industry of the Pacific Coast in 1928 in new mills, additions and major improvement programs. This is perhaps not quite so imposing a net figure as presented in the two years immediately preceding when tonnage was increased on a scale that some chose to call "alarming" or even more descriptive epithets.

With all construction completed that was in progress at the close of 1928 the Pacific Coast pulp and paper industry will have an added daily capacity of 890 tons of all grades of pulp and 425 tons of all grades of paper. In point of individual projects this has meant the construction of five entirely new mills—on three of which some construction was still in progress at the close of the year. It has meant increasing capacity in substantial amounts in six established mills and the entire rebuilding and enlargement of one old mill that has been idle for some years. This last named program amounts virtually to the building of a new mill as the revision of plans were quite radical.

The bulk of the construction work was done in Washington in the Puget Sound-Olympic Peninsula area, where the combination of heavy timber stands and favorable tide-water locations have served perhaps to encourage first development.

Tacoma, Washington, located on Puget Sound, has long been known as a lumber manufacturing capital. Its extensive tide flat industrial area is dotted with many sawmills. In 1928, however, Tacoma moved definitely into the pulp manufacturing geography with the com-

pletion of two new pulp mills, both of which, incidentally, draw their principal wood requirements from the waste of sawmills.

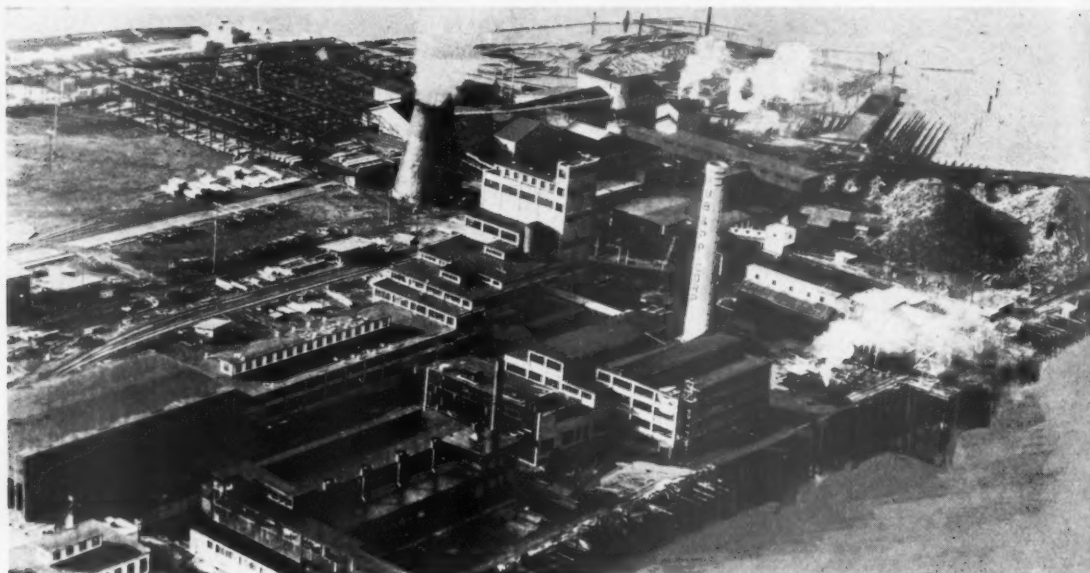
First of these new Tacoma mills is that of the Union Bag & Paper Power Corp., a wholly owned subsidiary company of the old established Union Bag & Paper Corp. with numerous plants in the East and Middle West. Building of Union Bag's new \$2,500,000 Tacoma mill marks a significant step in the history of the company and of the Pacific Coast because it is the definite

SOME IMPORTANT COAST ADDITIONS IN 1928

Union Bag & Paper Power Corp., Tacoma, new 120-ton sulphate pulp mill.
 Shaffer Box Co., Tacoma, new 50-ton sulphite pulp mill.
 Grays Harbor Pulp & Paper Co., Hoquiam, new 150-ton sulphite pulp mill and 50-ton paper mill.
 National Paper Products Co., Port Townsend, new 200-ton sulphate pulp and paper mill.
 Sitka Spruce Pulp & Paper Co., Empire, new 75-ton unbleached sulphite pulp mill.
 Hawley Pulp & Paper Co., Oregon City, new 234-inch news machine and new groundwood mill.
 Oregon Pulp & Paper Co., Salem, added fifth sulphite digester.
 San Juan Pulp Mfg. Co., Bellingham, doubled capacity.
 Longview Fibre Co., Longview, new machine, new groundwood mill.

transfer of a portion of the company's pulp manufacturing activities from the East to the West, a move which had become necessary with mounting wood costs at the Eastern pulp mills of the company making the continuance of pulp manufacturing there approach the prohibitive. The Tacoma mill was constructed to supply a part of the pulp demands of the company's Eastern paper mills on the Atlantic seaboard. The Tacoma mill supplies purely an internal demand, no pulp being sold on the open market.

Selection of Tacoma as a site for the new mill came as the result of an extended tour of personal investigation of the Pacific Coast by President C. R. McMillen of the Union Bag & Paper Corp. in 1927. Tacoma presented certain municipal advantages in the way of power and industrial water. It had tide-water and transcontinental rail shipping facilities. But beyond these advantages it had a great timber industry which offered a potential source of supply in sawmill waste. The Union Bag company arranged with the St. Paul & Tacoma Lumber Co., one of the Pacific Coast's largest lumber concerns, to use its sawmill waste. To facilitate matters and to make a more compact manufactur-



The new 120-ton sulphate pulp mill of the Union Bag & Paper Power Corp. at Tacoma marks a transfer of pulp manufacturing activities to the Pacific Coast.

ing unit the St. Paul & Tacoma Lumber Co. erected a new and modern all-electric sawmill on a site adjacent to the pulp mill site. This new lumber mill cuts hemlock exclusively and diverts its waste directly to the pulp mill.

Construction on the new pulp mill began with the new year and pulp production began in November. The mill is of first class construction throughout, steel, concrete and brick being employed to provide modern and durable buildings. The unit now in operation, as has been stated, has a daily capacity of 120 tons of sulphate pulp, but the buildings have been so designed and constructed with temporary walls on some sides to permit unhindered doubling of the plant at any time.

Hardy S. Ferguson, New York consulting engineer, designed the mill and construction was carried out by the company's own resident engineer, L. R. Wood.

Innovations in Tacoma Mill

The Tacoma mill embodies several departures from the ordinary practice. One of the principal aims in design was the elimination of the characteristic kraft mill odor which many people find objectionable. Another deviation is the method of washing the pulp on a two-stage Oliver vacuum filter washer, in contrast to the more usual method of washing in diffuser tanks. Another departure is the installation of five Wagner recovery furnaces instead of the older type of rotaries.

Chips are cooked in four Blaw-Knox stationary digesters, employing the Morterud system of indirect cooking. A new practice in blowing the digesters has been evolved by substituting a 20-foot diameter cylindrical blow tank for the customary ring of diffuser tanks and stock chests. The object is to keep the process entirely enclosed and to lead the steam and non-condensable gasses to condenser, from where the condensed steam is discharged to sewer and the non-condensable gasses are passed to Wagner furnaces to be burned.

After washing the pulp passes through two Kamyr wet machines from where it passes about 55 percent air dry to the Fidalgo type dryers. The Hesse-Ersted

heavy duty mechanical balers compress the pulp for shipment.

In the recovery room the five Wagner furnaces are connected to 500 h.p. waste heat boilers. Each furnace is a complete unit with boiler, scrubber and auxiliary equipment.

In the annual report of the Union Bag & Paper Corp. for the year ending December 31, 1927, the statement to the stockholders casts some light on the reasons for the company's establishing a pulp mill on the Pacific Coast. Quoting from that report, we find:

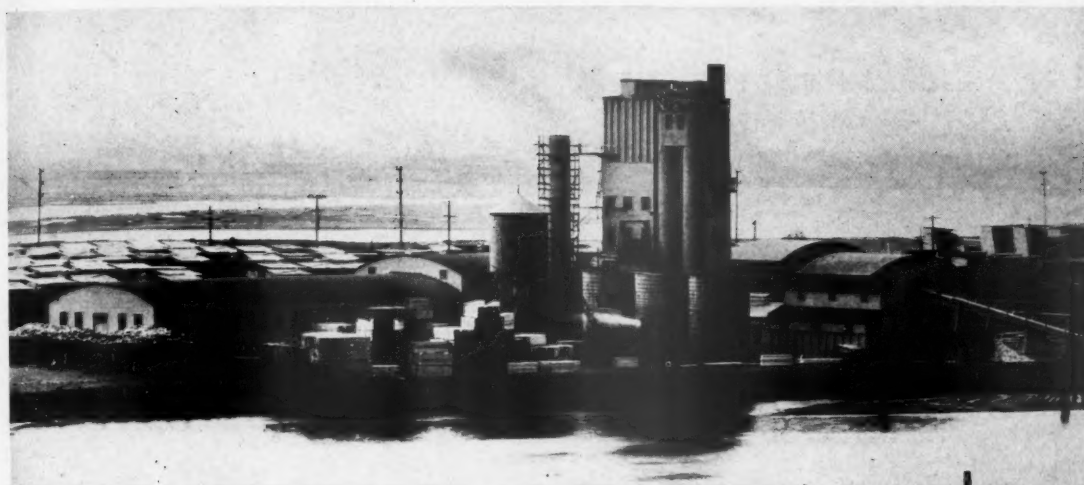
Diminution of Pulpwood

"The gradual diminution of pulpwood in the northern and eastern sections of the country where the company's pulp and papermaking plants are located has reached the point where it is necessary to relocate these pulp mills. The largest present supply of pulpwood is found in the Pacific Northwest, and your management, after thorough investigation, has determined that to be the best location for a new pulp mill. Accordingly, we are now constructing on tidewater harbor frontage in the city of Tacoma, Washington, a thoroughly modern kraft pulp mill, which will produce approximately 40,000 tons annually of sulphate pulp, essential to the business of the company, at a very material saving in cost of raw material.

"This new plant will be completed during the fall of this year and will provide a large proportion of the company's pulp requirements. Pulpwood, the principal raw material, has been contracted for over a long term of years and at favorable rates from one of the largest and strongest lumber companies on the Pacific Coast, whose mills are located on property adjoining ours.

"In making this rearrangement of manufacturing facilities, some of the mills now located in the East have been closed down and the logs and supplies maintained for the operation of those mills have been disposed of."

The second Tacoma mill is that of the Shaffer Box Co. Construction on it was also begun and completed during the calendar year. It is a 50-ton unbleached



The new 50-ton sulphite pulp mill of the Shaffer Box Co. at Tacoma operates principally on waste.

sulphite pulp mill and while offering no especial points of interest in the way of radical departures in operating practice it has, nevertheless, a number of points of interest in other ways worth recounting.

The Shaffer Box Co., headed by President Ralph Shaffer, has long been in the box lumber manufacturing business. It is a combination sawmill and box lumber factory cutting Western hemlock exclusively to the tune of about 60,000,000 f.b.m. yearly. Mere disposal of mill waste had for a long time proved expensive, and seeking a means to eliminate this expense and also to find a profitable outlet for the waste, the idea of hooking up a pulp mill with the lumber plant was conceived.

With pulp in the complete manufacturing program the company finds an outlet for several types of material that formerly had to be classed as waste. Briefly, some of these forms of waste are: logs unsuitable for the better grades of lumber, slabs, edgings, short lengths and narrow widths. Material unsuitable for pulp, together with waste from the box factory is hogged for use as fuel in a new steam plant built at the same time as the pulp mill.

New Type Barkers

At the Shaffer mill wood preparation is carried out in the sawmill department and the pulp mill really begins with the chippers. R. H. Pangborn, superintendent of the sawmill and box factory, has devised two new types of barkers in the wood preparation division, both designed to handle slabs and edgings.

Design and construction of the pulp mill proper was carried out by L. A. DeGuere, consulting engineer, who has built a number of mills in Wisconsin and other sections. The Shaffer mill has two Willamette digesters, Jenssen acid towers, Smith & Valley screens, Kamyr wet press, Fidalgo dryer and Hesse-Ersted heavy duty mechanical baler. It is interesting to note in passing that the Kamyr press installed in the Shaffer mill, along with the two in the Union Bag mill are the first Kamyr presses to be installed on the Pacific Coast and all three are in the same city.

The Shaffer mill employs heavy mill type construction in most parts of the mill, but concrete footings for all machinery and building foundations are provided, making for inexpensive but durable construction

throughout. The mill has transcontinental rail connections and tide-water frontage for shallow draft vessels. The investment in the pulp mill is estimated at \$750,000.

While discussing Tacoma, one cannot overlook two important additions to Tacoma's industrial tide flats made during the year, very closely related to pulp and paper manufacturing. These two are the new electrochemical plants constructed during the year by the Hooker Electrochemical Co. and the Tacoma Electrochemical Co. The first is a Pacific Coast branch of the parent company at Niagara Falls, N. Y., while the second is a subsidiary of the Pennsylvania Salt Co., another Eastern company. Both plants were built to manufacture chlorine for pulp bleaching as their main product and both were located on the Pacific Coast to provide a distributing center for a recognized growth of the pulp and paper industry on the Coast. The equipment in these two plants is of the most modern type and the investment in both totals approximately \$2,500,000.

Grays Harbor Mill

Another Washington center which has for some time been the scene of much pulp and paper mill discussion and which came into being as an actual producing center in 1928 is the Grays Harbor region in Southwestern Washington. This region on the far Western rim is comprised of a trio of lumbering cities, Hoquiam, Aberdeen and Cosmopolis. Here is the center of the "fog belt" where "trees that are trees" grow faster, bigger and better than practically any place in the world. With an average annual rainfall of more than 80 inches, and with temperate winds sweeping in across the Pacific the climate is exceptionally favorable for the growing of timber.

In July, 1927, construction was started on Grays Harbor's first pulp mill, the 150-ton bleached sulphite plant of the Grays Harbor Pulp Co. This was an independent organization headed by E. M. Mills, an executive of the Zellerbach Corp. Some of the other officers also held office in the Zellerbach Corp. or its subsidiaries, but the companies themselves were entirely distinct and separate organizations.

The Grays Harbor mill is in many respects similar to the plant of Rainier Pulp & Paper Co. at Shelton, Wash., of which Mr. Mills is president also. The site



A new industry came to Grays Harbor when the Grays Harbor Pulp & Paper Co. completed a 150-ton bleached sulphite unit in 1928. Construction is now progressing on a 50-ton paper mill unit.

selected at Hoquiam occupies 26 acres and is tide-flat land at the junction of the Chehalis and Hoquiam rivers. The mill has its own deep water dock for ocean shipments and rail connections with transcontinental lines. An interesting point about the site is that it was at one time occupied by a large lumber mill which was subsequently destroyed by fire. The pulp mill now covers the site of a huge refuse burner which once consumed thousands of cords of the same type of material which is now largely being converted to pulp.

V. D. Simons, consulting engineer of Chicago, designed and superintended the building of the mill. Construction of the mill is of first quality concrete, steel and glass. Work progressed steadily through the winter under Chris Kuppler's Sons, contractors, who held the building contract. The mill has two main units, first a power plant, and second—which is really a group of buildings built with common walls between—the pulp mill proper consisting of acid plant, lime and sulphur storage, digester house, blowpits, screen room, bleach plant, machine room, warehouse and water filter plant.

Power Plant Features

The power plant embodies some new features of design. It operates on 375 lbs. of steam pressure with 150 degrees of superheat. There are four Stirling type boilers with a total plant capacity of about 8380 h.p. The plant is designed to utilize hogged hemlock fuel, which is derived from the waste of wood room operations and through purchase from neighboring sawmills. The fuel is fed from storage to inclined step grates by means of electrically driven steel apron conveyors. The aim of the power plant has been to get the utmost work out of the fuel available, and to make the plant as automatic as possible. Fuel is handled entirely by conveyors. Recording instruments of many kinds check boiler performance. Heat exchangers, a continuous blowdown system, utilization of steam process condensate, and similar devices are exploited to secure the greatest fuel efficiency. Two steam turbines supply the mill's power requirements. One of the turbines is a

high pressure unit designed to bleed at 30 lbs. back pressure and pass steam on for process work.

In general the motive back of the power plant is to get more total work out of the steam by taking advantage of the fact that it costs comparatively less to raise the steam to a higher pressure, once it has been created, and then at this higher pressure, to get out the power energy before diverting the heat to process work, making the steam do as much as possible before it returns to the boilers in the form of feed water.

The pulp mill proper has three digesters 19 ft. 3 in. in diameter by 58 ft. in height, said to be the second largest in the world. Blowpits are of new design, having vaulted roofs and being entirely lined with special tile. Eight stock chests give the plan flexibility. Bleaching is accomplished in two stages in ten vertical bleach engines. A Black-Clawson vertical dryer is used at Grays Harbor and pulp is baled in sheets under hydraulic pressure for either water or rail shipment.

Waste Utilized

A significant feature of the Grays Harbor mill is that it draws a large portion of its wood requirements from the waste of neighboring sawmills. Chipping plants, operated under the supervision of the pulp mill, have been established at a number of sawmills. One mill immediately adjoining delivers its chips and hog fuel on a double belt conveyor more than 1000 feet long.

As the construction on the pulp mill unit was nearing completion in July, 1928, a rather momentous piece of news to the industry was announced. This news was that the Hammermill Paper Co. of Erie, Pa., had entered into an agreement with Isadore Zellerbach, Edward M. Mills, J. D. Zellerbach, M. M. Baruh, J. J. Baruh and John C. Higgins of New York for the purpose of erecting a paper mill on the Pacific Coast. The mill was to have an initial daily capacity of 50 tons of paper and was to be built adjacent to the Grays Harbor Pulp Company's mill. As finally shaped up this meant a reorganization of the original Grays Harbor Pulp Co. to form the Grays Harbor Pulp & Paper Co. This



The completed mill of the National Paper Products Co. at Port Townsend will have a daily capacity of 200 tons of sulphate pulp and the same amount of kraft paper and liner.
Photo by John Cress, Seattle

new company is a new and distinct organization growing out of the Hammermill and Grays Harbor companies.

Mr. Mills is president of the new company and W. S. Lucey has come to Grays Harbor from Erie to take charge. He is a vice-president of the Grays Harbor Pulp & Paper Co. Construction on the new paper mill unit was well under way as the year closed. It immediately adjoins the pulp mill and will manufacture the Hammermill grade of bond papers, when completed. The paper mill unit will be as modern as industrial scientific knowledge today permits. A new machine with a wire width of 202 inches is being installed. It is designed for speeds ranging from 250 to 1000 feet per minute. Most of the paper mill equipment will be of special design.

Advantageous Location

Production of the paper mill will be devoted first to Pacific Coast distribution of Hammermill, but the deep water docks at the mill's doors make readily feasible direct shipment of paper to the large markets on the Atlantic seaboard. The transfer of a part of Hammermill's manufacturing activities to the Pacific Coast is regarded in the industry as one of the most significant events of the year, being in effect a recognition of the Pacific Coast's lower manufacturing costs.

Completed the plant of the Grays Harbor Pulp & Paper Co. will represent on estimated investment of \$6,000,000.

Of other developments in the Grays Harbor district was the completion of the Aberdeen industrial water system, costing roundly one million dollars and designed to deliver 80,000,000 gallons of water daily. The primary motive behind its construction was to attract pulp and paper mills to the locality. Some very good prospects for achievement in this line appeared to be possible of early realization as the year closed.

The only other pulp and paper work undertaken in Grays Harbor during the year was the filling of the site

of the proposed West Lumber & Pulp Co., at Junction City, a project in which B. T. McBain was interested. No work beyond the filling of the site was undertaken, however.

Another center of interest during the year was Port Townsend, Wash. This old city which has slept peacefully since its hectic boom days of '88 felt the thrill of new blood in its sluggish veins when the National Paper Products Co., a Zellerbach Corp. subsidiary, decided to build a 100-ton mill for the manufacture of kraft pulp and test liner. Port Townsend is situated at the Northwest entrance to Puget Sound and commands a vast timber area.

Construction of the mill began in the summer of 1927 and the first unit was put into operation in October, 1928. The mill has its own deep water docks and rail connection with the Olympic Peninsula division of a transcontinental railroad.

In June, 1928, when the first 100-ton unit was nearing completion the company announced that it would build a second complete 100-ton unit immediately adjoining the first unit and install a 253-inch kraft paper machine designed for speeds up to 1000 feet a minute. This machine has been rated the largest kraft machine in the world.

Mills Similar

The first 100-ton unit of the Port Townsend mill contains three stationary digesters, Oliver vacuum filters for stock washing, batch type causticizing plant, 130-inch Black-Clawson vertical type cylinder board machine, recovery system with waste heat boilers, and power plant operating at 375 lbs. pressure. The power plant bears great similarity in design to the power plant of the Grays Harbor Pulp & Paper Co. previously described.

The second unit will be a practical duplicate of the first unit. Production of paper was expected to start about April 1st. The entire output of the paper mill



The San Juan Pulp Manufacturing Co. at Bellingham doubled its plant during the year, bringing the daily capacity up to 90 tons of unbleached sulphite.

Brubaker Aerial Surveys, Portland

unit has been contracted to the Bates Valve Bag Corp., makers of multi-wall bags for cement and other bulk products.

V. D. Simons handled the engineering of the mill and followed the same modern high type of concrete and steel construction as employed in the other mills constructed under his supervision in recent years on the Coast. The completed mill will represent an investment estimated at \$6,000,000.

A notable feature of the Port Townsend mill is the continuous flow of materials through the plant from wood to finished product. Overhead P. & H. mono-rail conveyors and other forms of machine handling are used throughout. Much of the wood comes to the mill in the form of chips manufactured at several chipping plants established in connection with sawmills on Puget Sound. Incidentally it should be noted that a portion of the wood requirements are to be supplied by a chipping plant constructed at Neah Bay, on the extreme Northwest corner of the Olympic Peninsula, to make chips directly from the forest.

City Supplies Water

To supply the mill's water needs the City of Port Townsend built a 31-mile pipe line carrying 14,000,000 gallons of water daily.

At Bellingham, Wash., during the year the San Juan Pulp Mfg. Co. increased the capacity of its unbleached sulphite plant from 45 daily tons to 90 tons. This company, headed by President Ossian Anderson, first began production in October, 1926. It was designed principally to make use of sawmill waste.

The 1928 program included the addition of two more digesters to make a total of four, installation of an 800 h.p. boiler, enlarged wood room, enlarged drying room and installation of two additional Fidalgo type pulp dryers of improved types. Enlargement of course necessitated installation of additional auxiliary equipment, increased capacity of the acid system, and so on.

One of the notable additions was the installation of Hesse-Ersted mechanical balers to compress the pulp

to 51 cubic feet or better per ton in order to take advantage of the minimum water rate on pulp shipments to the Atlantic and Gulf ports.

The mill of the Longview Fibre Co. at Longview, Wash., augmented its capacity during the year in three directions; first, installation of a Yankee type paper machine for the manufacture of M. G. Kraft wrapping paper; second, installation of a paper bag factory; and third, building of a 20-ton groundwood mill.

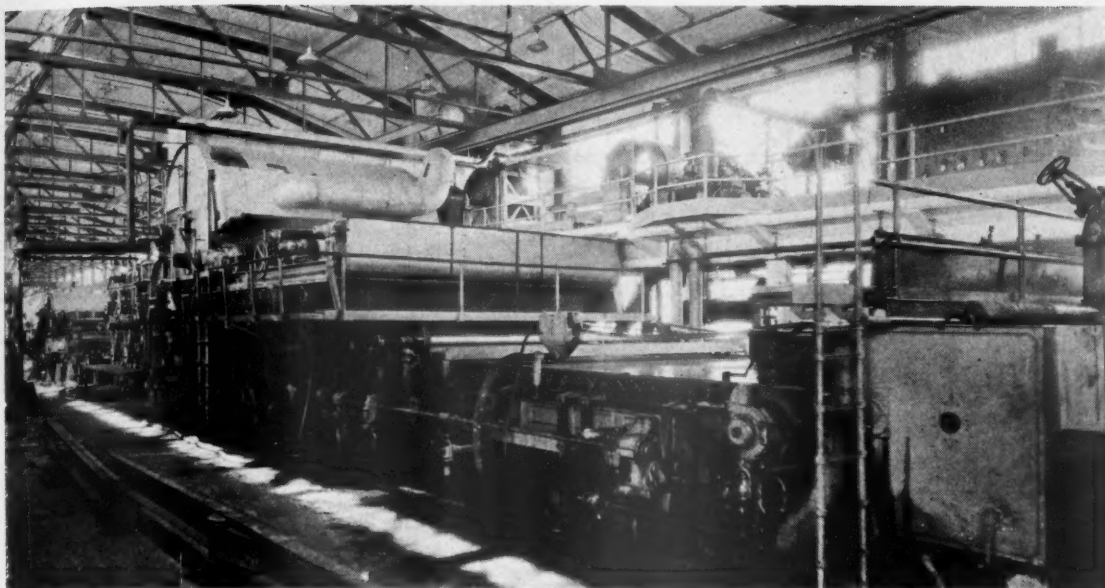
The Longview mill is an outgrowth of the well-known Thilmany Pulp & Paper Co. of Kaukauna, Wisconsin. Decision of these interests to locate a mill at Longview marked the entry of Eastern capital into the Pacific Coast field. The first unit of the mill, designed for the daily production of 100 tons of sulphate pulp and 100 tons of kraft container board was completed in October, 1927. The mill occupies a site adjoining the huge Douglas fir lumber mills of the Long-Bell Lumber Co., which cut 1,800,000 feet daily. The opportunity to utilize the waste from this big sawmill was largely responsible for location of the plant at Longview.

The first unit included footings for a Yankee type paper machine. Incidentally this is the largest machine of its type in the world, the big cylinder having a diameter of 12 feet, a face of 176 inches, and weighing about 55 tons. The Yankee machine began production in June, 1928, on a new line of machine glazed kraft wrapping, bag and specialty papers. It has a daily capacity of about 30 tons.

Utilize Fir Mill Waste

The Longview mill is a pioneer in the use of Douglas fir mill waste. It has been making a 100% Douglas fir pulp for its kraft container board and has been the only mill to date to utilize fir exclusively. With the installation of the Yankee machine, however, a hemlock cut up mill was installed and a proportion of hemlock has been used in the M. G. papers.

At the close of the year the Longview company announced its intention to install a 20-ton groundwood mill to supply a bulk that had hitherto been secured



The Longview Fibre Co. installed this Yankee type paper machine during the year, the largest of its kind in the world. It gives the mill an added capacity of 35 tons of kraft paper daily.

through the use of waste paper. The groundwood mill was nearing completion as this was written. It contains two electrically driven three-pocket grinders.

Still another improvement effected by the Longview Fibre Co. during the year was the equipment of a paper bag factory using from seven to eight tons of paper daily.

At Vancouver, Wash., some changes were also effected. The Columbia River Paper Mills erected a new one-story brick building adjoining the mill and leased the same to the Union Bag & Paper Corp. The latter named company has installed a modern bag factory. Supervision of this unit comes under the charge of W. W. Griffith, resident manager of the Union Bag & Paper Power Corp. mill at Tacoma.

The City of Vancouver vacated a street adjoining the Columbia River Paper Mills during the year and considerable speculation has been rife regarding what further improvement the Columbia River Mill might undertake. The mill now has two paper machines, one of which was added last year. The vacated street exactly parallels the present machine room and is situated just about right for location of a third machine. Since the holding company of the Leadbetter interests—controlling the Columbia River Paper Mills—has acquired the old Port Mellon mill in B. C. and is now rebuilding it and considerably enlarging it, the third machine seems a logical next move. No official confirmation on this point has been given out, however.

Oregon Development

Oregon did not show development during the year on the same scale as Washington. Only one new mill was actually started. This was the Sitka Spruce Pulp & Paper Co. at Empire, Oregon. Rumors of some development at Empire, which is situated near Marshfield in the Coos Bay district of the Oregon Coast, had preceded the actual announcement. The company has been incorporated for \$1,000,000 under Nevada laws and is headed by C. McC. Johnson, a pioneer lumberman of Oregon. Mr. Johnson is a brother-in-law of

Stanley Dollar of the Dollar Steamship Lines, and it is understood that some Dollar money is in the Coos Bay enterprise. The location is in a heavily timbered region which has not been greatly tapped to date.

Construction of the mill began as the year drew to a close and was progressing rapidly as this was written. The plant is to have a daily capacity of 75 tons of unbleached sulphite pulp. A sawmill is being constructed in connection and waste will be diverted to the pulp mill. Construction of the mill is under supervision of J. B. Wilt, a man who is quite well known in the sulphite industry. He is assisted by E. T. Bellew, who was recently associated with L. A. DeGuere, consulting pulp and paper engineer.

At Salem, Oregon, the Oregon Pulp & Paper Co. completed a program that had started the year previous. In 1927 a new paper machine was installed and two new digesters were added. During 1928 a fifth digester was added, coming into production in July and Bringing the mill capacity up to about 110 tons daily. The mill produces bleached sulphite and is the only mill on the Coast at present manufacturing glassine, grease-proof and similar specialties.

Hawley Mill Improvements

The Hawley Pulp & Paper Co. at Oregon City completed in April an extensive improvement program which had been begun in May of the year previous. The additions represented an investment of about \$2,000,000. The improvements consisted principally of the dismantling of one 164-inch news machine and replacing it with a new modern high speed 234-inch machine, and the construction of a modern all-electric groundwood mill. New buildings were constructed to house both of the new units. Some improvements were also carried out in the steam plant and some changes for the better were made to the other machines.

Installation of the new machine represented quite a feat of engineering. Speed was the watchword once the work was started. The older machine was kept running up to the last moment before dismantling and



The Hawley Pulp & Paper Co. at Oregon City completed a \$2,000,000 improvement program early in 1928

then dismantled in a hurry while workmen at the same time attacked the walls of the machine room to make way for a more modern structure.

The new machine is a Beloit of most modern design and designed for high speeds. It first began production late in February, 1928.

The new groundwood mill is housed in a building of its own of modern concrete and steel construction of the first order. The equipment consists of five three-pocket 54x56-inch grinders made by the Montague Machine Works. Each grinder is driven by a 1000 h.p. motor. Wood is delivered in one-cord racks by means of an overhead monorail system. The groundwood mill is four stories high and contains all the necessary screens and riffles for refining the pulp. Refined stock is slushed to the machine room in ordinary practice, but ample storage facilities are also available.

Other more minor improvements in the Hawley plant completed during the year included changes in the finishing room and warehouse and in yard facilities. The company now has under consideration further improvements for the near future which would include rebuilding of the sulphite mill and building of a new central steam power plant. The improvement program completed during 1928 was carried out under the supervision of V. D. Simons of Chicago.

Portland and Pacific Northwest Paper Mills, manufacturing a specialty line of papers known by the trade name of ADWRAP doubled its plant capacity during the year and otherwise improved.

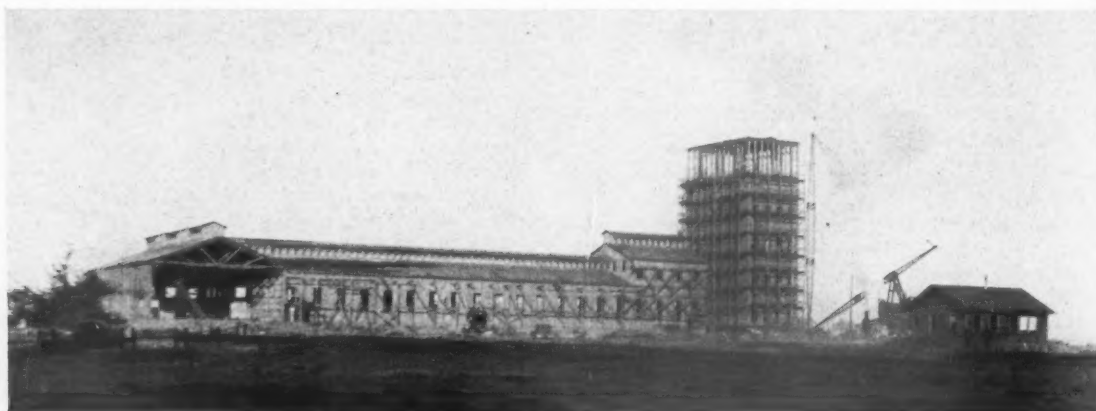
Another improvement at Portland was the installation of a gummed paper division at the plant of the Western Waxed Paper Co. This involved the building of a new unit and development of new type machinery, representing in total a considerable capital expenditure.

While no mill extensions were made at the St. Helens Pulp & Paper Co. two events of significance transpired. The first was the location of a branch of the Jaite Bag Co. of Ohio adjoining the St. Helens mill to manufacture multi-wall paper bags for cement and other bulk products. The second was the purchase of the California Bag & Paper Co. plant by the St. Helens Pulp & Paper Co., and the transfer of the entire plant from the former location at Emeryville, Calif., to a new building on a site adjoining the paper mill.

British Columbia also saw some activity during the year. Perhaps of first importance was the beginning of work on the rebuilding of the old Port Mellon mill which has been idle for some years before being taken over by the Leadbetter interests headed by F. W. Leadbetter of Portland. The company is now known as the Vancouver Kraft Co. Ltd.

The Port Mellon program amounts virtually to the building of a new mill as much of the original equipment has become obsolete in the period of disuse. When completed the plant will have a daily capacity of 110 tons of sulphate pulp and represent a plant investment of about \$2,500,000.

Port Mellon is located about 25 miles north of Vancouver, B. C. The mill has deep water frontage and



The Sitka Spruce Pulp & Paper Co. is now building a 75-ton sulphite pulp mill at Empire

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Supplement to Pacific Pulp & Paper Industry

ALFRED E. McMASTER
General Manager, Powell River Co., Ltd.







Photo Copyright by F. W. Hooper

The Pacific Coast's most Northerly mill, Pacific Mills Ltd. at Ocean Falls, made a number of improvements during the year.

holds a power site adjoining capable of developing about 2900 h.p.

Work on the mill was progressing as the year closed. The digesters of European make are being installed. The docks are being improved and a sawmill is to be constructed. A steam plant is also included in the program to supply a part of the mill's power needs. Production will probably begin in the fall of 1929.

The company holds long-time contract for the sale of its output to the Bates Valve Bag Corp., and to its affiliated company, the Columbia River Paper Mills of Vancouver, Wash.

The Powell River Co., Ltd., while not increasing the capacity of its big news print plant, made a notable improvement in its steam plant which is worthy of mention. The steam plant is supposed to meet only the requirements of process steam, but standby steam turbines with an aggregate of 2000 k.w. are installed. The plant houses six batteries of boilers, each consisting of two 4,900 sq. ft. water tube boilers. The plant is designed to burn hogged fuel and oil, or, with slight modification, coal. Hogged fuel produced in the wood room is burned as well as large quantities of hogged fuel imported from B. C. saw mills. The conveyors are designed to collect the refuse from the wood room and deliver it to the boiler or storage. These conveyors are heavy enough to carry the load should the power plant operate on hogged fuel exclusively. The plant is designed to be flexible. Installation of various economizers can be made with facility if deemed feasible, operation on either oil or hogged fuel is possible now. With but slight change coal also could be utilized, either by mechanical stokers or in pulverized form.

Pacific Mills, Ltd., at Ocean Falls, the Pacific Coast's most northerly mill, made some improvements during the year. This is a greatly diversified mill producing newsprint, kraft and sulphate wrappings, and also going extensively into paper converting. A new waxing machine was put into production in July and two printing presses to operate on fruit wrappers were also put to work in midsummer.

In the groundwood mill the old wooden building was replaced with a modern concrete structure, this unit

being the last to be converted from wood to concrete. Another important change was the rebuilding of one machine operating on kraft papers. This move stepped up the mill's kraft production about 10 tons daily. The entire program carried out during the year represents an expenditure estimated at \$500,000. As the year closes there are hints of further revamping at Ocean Falls during 1929, a part of a policy of general improvement in all the mills coming into control of the recently merged Crown Zellerbach Corp.

In California the California Fruit Wrapping Mills, Inc., at Pomona, doubled its capacity during the year with the installation of a second machine. This mill was originally built in 1926 to supply a fruit wrap market in the Southern California citrus fruit fields. A Yankee type machine was first installed. In 1928 a second machine, fourdrinier type, was put into production. The mill now has a daily capacity of 20 tons of fruit wraps. Pulp is purchased on the market. F. O. Fernstrom, president, reports that the original market in the citrus fields has been expanded and now includes the apple orchards of Washington as well as considerable export business in New Zealand and Australia.

Although a bit apart from the regular sphere of paper production, a unit somewhat allied is the new mill of the Johns-Manville Corporation, completed during the year at Pittsburg, Calif., at a cost of approximately \$2,000,000. This is purely a specialty mill, manufacturing asbestos insulating papers from asbestos fibre.

Another improvement program that should not be overlooked, but which is somewhat scattered, is the expenditure of \$1,000,000 by Fibreboard Products, Inc. This program is extended to all the mills of the group and has consisted of a general study, revamping and modernizing to affect further manufacturing economies under the merged plan of operation.

Viewed as a whole the progress made by the Coast industry in 1928 shows a continued expansion and development of the Pacific Coast's wood resources, and, if a word on the future might be added in closing, the immediate future holds forth a promise of a continuation of this march of progress.

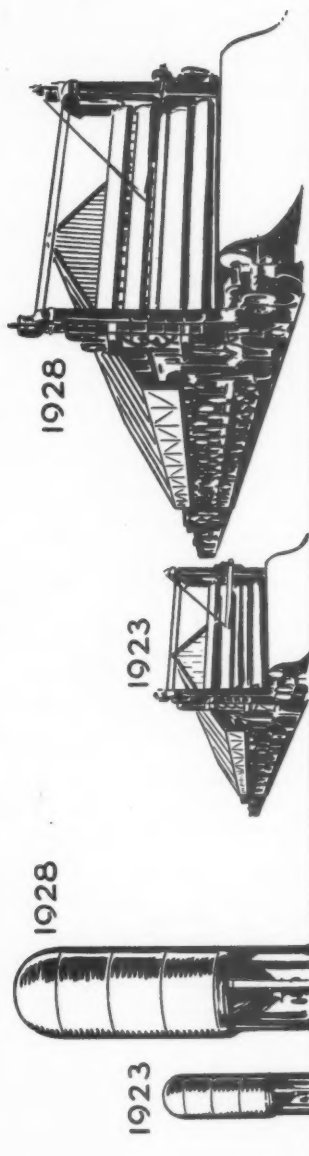
PACIFIC COAST PULP AND PAPER INDUSTRIAL GROWTH

Showing Development in Five Year Period 1923-1928*

	No. of Mills		No. Paper Machines		Sulphite Pulp		Sulphate Pulp**		Mechanical Pulp		Paper	
	1923	1928	1923	1928	1923	1928	1923	1928	1923	1928	1923	1928
California	8	12	4	16	21	5	25	35	40	15	20	15
Oregon	5	8	3	17	21	4	255	365	43.1	60	480	635
Washington	7	22	15	17	34	17	285	855	200.0	500	315	475
British Columbia	4	8	4	8	14	6	245	300	22.4	50	150	540
Total Pacific Coast	24	50	26	58	90	32	790	1,555	96.8	50	710	1,205
New Mills Built in Five Years	26											
New Paper Machines added in Five Years	32											

*Includes also new construction or additions in progress on Dec. 31, 1928, scheduled for early 1929 production.

**Includes 73 tons of Soda Pulp manufactured in Washington.



Total Daily Production All Grades of Pulp

1923—2,045 tons
1928—3,930 tons

Total Daily Production All Grades of Paper and Board

1923—2,056 tons
1928—3,751 tons

Increase in Daily Paper Capacities (all grades) 1,695 tons or 82.4%
Increase in Daily Pulp Capacities (all grades) 1,885 tons or 92.1%

WOODPULP PRODUCTION—1921-1928

Pacific Coast States and British Columbia

	1921 Tons	1922 Tons	1923 Tons	1924 Tons	1925 Tons	1926 Tons	1927 Tons	1928*	Tons
Washington	93,161	↑	136,943	159,539	161,858	199,164	268,349	415,930	
Oregon and California	124,494	↑	162,653	149,894	160,736	178,841	200,869	239,569	
British Columbia	164,746	197,327	217,076	216,243	230,733	259,504	296,253	300,000	
Total Pacific Coast	384,401	↑	516,672	525,676	553,327	637,509	775,471	955,499	

Source—U. S. figures from U. S. Dept. of Commerce, Bureau of Census; B. C. figures from Dept. of Lands, Forest Branch.

†Not available.

*1928 figures are estimates based on operations of previous years, adjusted to include increased capacity of the industry arising through new or enlarged mills adding their production in 1927 and 1928, taking into consideration the month of the year the new units began operations.

PULP WOOD CONSUMPTION—1921-1928

Pacific Coast States and British Columbia

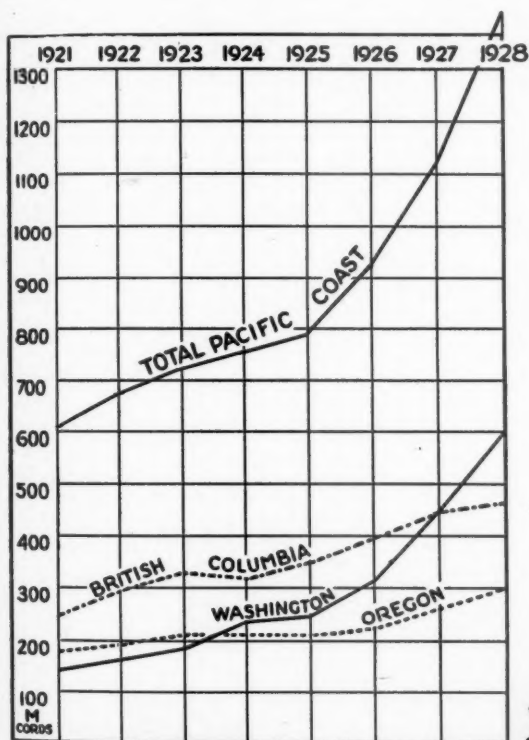
	1921 Cords	1922 Cords	1923 Cords	1924 Cords	1925 Cords	1926 Cords	1927 Cords	1928§	Cords
Washington	149,699	↑	191,751	230,299	241,150	305,787	445,664	600,000	
Oregon and California	192,869	↑	205,199	205,968	209,349	232,989	267,235	300,000	
British Columbia*	246,000	295,500	325,500	324,000	345,000	390,000	444,000	450,000	
Total Pacific Coast	588,568	↑	722,450	760,267	795,499	928,776	1,156,899	1,350,000	

Source—U. S. figures from U. S. Dept. of Commerce, Bureau of Census; B. C. figures from Dept. of Lands, Forest Branch.

*British Columbia figures are estimated on basis of 1½ cords of wood consumed per ton of wood pulp produced.

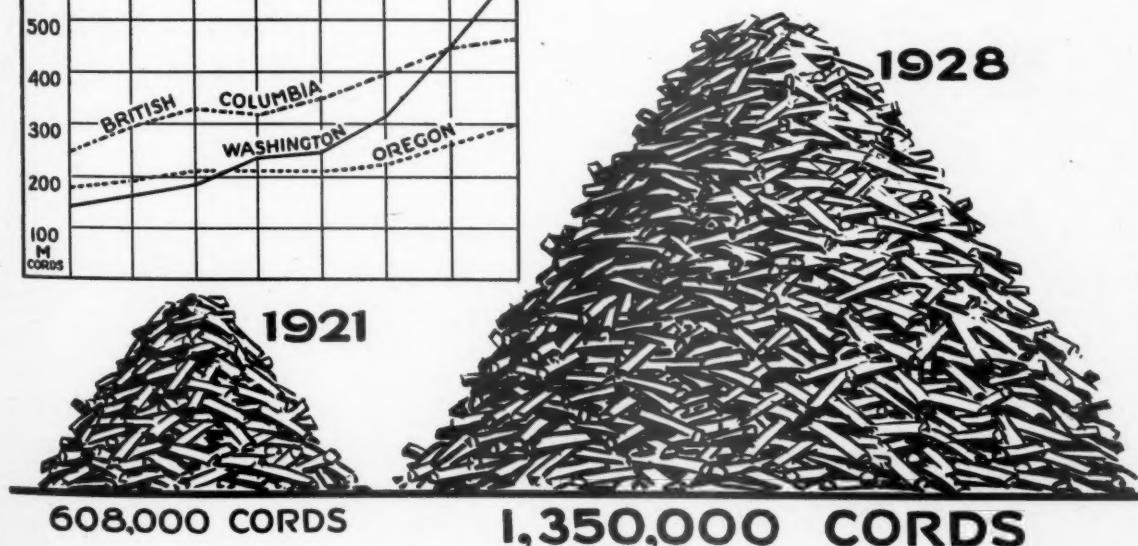
†Not available.

§1928 figures are estimates based on operations of previous years, adjusted to include increased capacity of the industry arising through new or enlarged mills adding their production in 1927 and 1928, taking into consideration the month of the year the new units began operations.

GROWTH OF
PULPWOOD CONSUMPTIONin the Pacific Coast States
and British Columbia

—1921 to 1928—

U. S. statistics from U. S. Department of Commerce; Canadian statistics from B. C. Department of Lands, Forest Branch. Figures for 1928 are estimates based on operations of previous years and additional capacities coming into production in 1927 and 1928.



Technical Progress

A Digest of Opinions From Pacific Coast Operators on Important Contributions to the Technical Advancement of the Pulp and Paper Industry During the Past Year and Some Comment on Problems That Remain to Be Solved.

EACH year the pulp and paper industry adds something to its vast fund of technical knowledge. Today we manufacture our products with the benefit of experience accumulated in all the years since the very inception of paper making. If you would really measure your own stature alongside the industry itself take a moment to set down those processes in the manufacture of pulp and paper, the development of which you alone are responsible. Now set your list down alongside the myriad processes and refinements of which you make daily use, but which were handed to you by those who went before. Truly, our stage of industrial advancement today represents the contributions of an army.

In an effort to learn what were considered the outstanding technical advancements in the industry, particularly as it pertains to Pacific Coast practice, a large number of practical operating men were interviewed. The present article presents a composite of their opinions. It deals not only with accomplishments, but looks also ahead and points out some of those problems which are still unsatisfactorily solved. All opinions presented come from Pacific Coast operators, but names have been withheld.

Advancement Is Gradual

It will be noted in the following paragraphs that some subjects are discussed more frequently than others. There are several mentions of the use of higher pressure steam and the attendant practice of bleeding power requirements before diverting the steam to process uses. The Minton vacuum dryer, brought to greater perfection during the year, and winning distinction by an award from TAPPI, was noted by many as the leading development. There is much discussion on the need for better waste utilization, better wood preparation. Several inquire specifically into the future use of Douglas fir waste.

Advancement is a gradual process. As one man points out:

"Most of the progress in the industry is a matter of rather long and arduous growth. At intervals we find an invention accomplishing very definite results in a short time but even these things have to have their periods of perfection and proof before they are, on the one hand, adaptable to the trade and on the other, considered of enough benefit to be accepted by it.

"The Minton vacuum dryer, for example, which won recognition by TAPPI during the year, is not yet generally accepted as being of great commercial benefit because, notwithstanding the installation of experimental machines by one of the leading newsprint companies many others are still considering the old type machines. The development of the Minton system is an example of something which took many years to work out.

"For real outstanding momentous changes in the industry it does not seem to me that we can pick out particular years, for it is more a matter of period growth than anything else. Even the invention of the Fourdrinier, the most outstanding change of all, was not accomplished over night. The invention of suction rolls had to depend upon other things and consider the great increase in speed of paper machines. It is very questionable whether such speeds as we have today would be commercially possible without the suction roll and perhaps the adjustable controlled inlet from the headbox, or the rotary screen, or the Sheehan carrier or improved systems of moisture evacuation or modern methods of stock control or synchronous motor drives."

Wood Preparation Important

"Wood preparation is the most important problem in connection with the manufacture of pulp on the Pacific Coast as compared with other places on the American continent and elsewhere," remarks another operator. Continuing, he states:

"The advances that have been made in wood preparation, whilst of a small degree as yet, I believe to be of the greatest importance as the success of cheap manufacture depends mainly on the saving in wood—the principal ingredient in the manufacture of pulp. Any step made in the saving of wood particularly pertaining to barking, (slabs for instance), I believe will have the greatest effect on the manufacture of pulp on this Coast as compared with elsewhere."

Periods of intense competition tend to refine operating practice it is pointed out by one engineer who remarks:

"During hard times the tendency is all to concentrate on the improvement of existing processes and machinery and to secure the utmost economy from equipment already installed. This, of course, frequently necessitates the purchase of additional equipment, but, at the same time, advances in general are along the lines of improvement rather than the introduction of new methods and machinery."

White Water Problem

The white water problem is described in one case as a "perrenial" problem. This man believes that—" . . . the use of white water instead of fresh water for showers has many possibilities, but creates also many difficulties. The problem of the economical filtering of the eventual mill over-flow is also a problem which to my mind has not yet been satisfactorily dealt with."

In the paper mill we find another interesting line of investigation—" . . . the control of temperature of stock at the wire, with a view to obtaining economy in pressing. Undoubtedly change in temperature conditions does, by its influence on the viscosity of the water,

modify press conditions and affect considerably the efficiency of the presses."

White water can be the difference between red and black (on the books) according to one technical man who states:

"The white water problem is another standby and I venture to say that if the present fiber loss was either prevented or recovered, many mills would be put on a paying basis. When losses as high as \$600.00 a day occur in a mill making 80 tons of paper a day, it can readily be seen that the saving of such an amount could put the mill on the right side of the ledger."

In the pulp mill one man interviewed regards as an important contribution—

"... the use of the Stebbins cooking system as has been demonstrated at Ogdenburg, N. Y. While it is true that similar systems have been used in the Scandinavian countries, this is the first attempt to put it into practice on this continent. The Hovey system of digester circulation is also worthy of mention."

Digester Size Limit

And another problem of the pulp mill is set out thus:

"So far, a satisfactory refiner does not seem to have been devised, that is, a refiner that will deal with tailings of such widely varying characteristics as those encountered in the average mill."

A chemist wonders regarding the possible limit in size of digesters as follows:

"Since better cooking control is possible in soda and sulphate mills there would be no limit to the digester size if the circulation problem did not restrict. The same applies even more so to the sulphite process, as cooking control is harder to effect. It seems, however, that here also the circulation problem is hampering all efforts to increase further. If we can overcome these drawbacks there seems to be no limit as to size of digesters."

Another interview brought some pertinent questions with regard to our present practices. This man said:

"The year 1928 brought us another pile of suggestions on digesting wood and other raw materials, but

many of them no doubt will be speculations only. The sulphite process still serves us unexcelled in one way and it still seems the best solution also for our raw material on the Coast. In the background, however, always loom the pertinent questions: The wood contains at least 10% more cellulose than the yield shows on an average, so what becomes of this other 10%? And what becomes of the 60% organic substance lost with the waste liquor? And what about pollution of adjoining waters? We feel there is still a big opportunity to improve things."

A path toward greater utilization is suggested in these words:

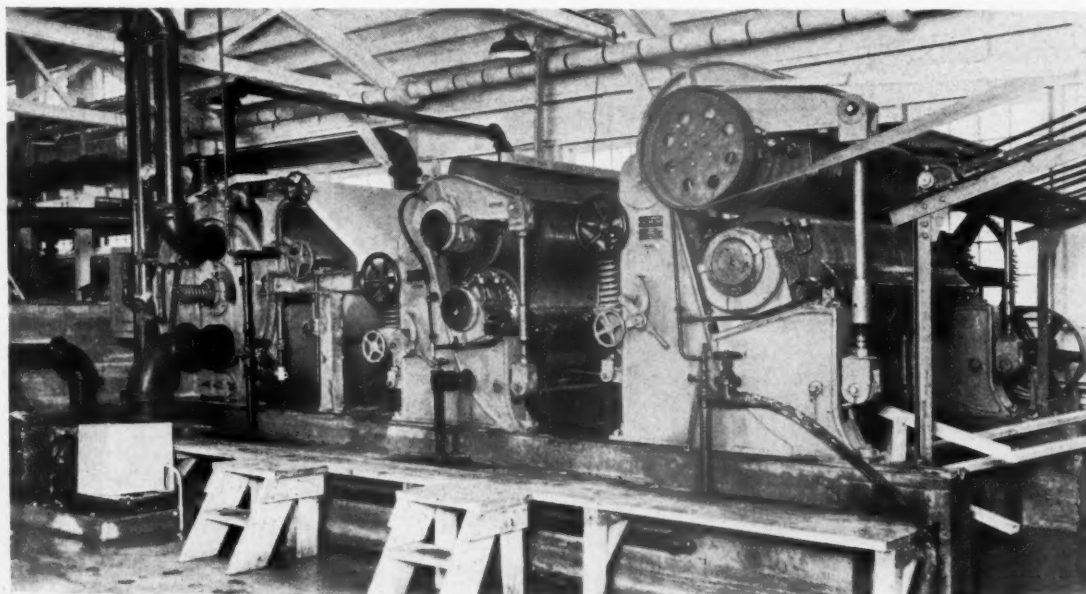
"The recovery of organical material from the liquor in form of acetone, methylated spirit, talloel and much hydrogen gas, when cooking sulphate pulp seems to be successful if made according to the Rinmann process which is used by an English concern at Regensburg (Germany)."

"Further efforts have been made to increase the yield when cooking sulphite, or to replace this process by a so-called semi-chemical treatment. As long as calcium bisulphite is used, any old Mitscherlich cook shows the road we have to go and using sodium bisulphite, the costs for chemicals become somewhat high, even if recovered."

Elimination of the well known kraft odor received several mentions as an outstanding advancement. One man, in no way connected with the mill referred to below, yet well acquainted with both Tacoma and the industry, stated that he regarded as one of the most important advances of the year—

"... the elimination of the objectionable odors from the sulphate process, as illustrated by the odorless kraft mill erected by the Union Bag & Paper Power Corp., at Tacoma. We had often heard of the odorless kraft mill before, but this time it is odorless. This in my mind removes the only objection to the erection of kraft mills near a city, and removes a great impediment to the advance of this popular process."

Another regards the "odorless" mill as highly important, but adds a note of doubt in saying "if it is



This Kamyr press, installed in the new sulphite mill of the Shaffer Box Co. at Tacoma in 1928, is one of the three first of its kind installed on the Pacific Coast.

odorless," and takes care to underline those four words. In fairness, however, it must be said that this man has had very little opportunity to observe Tacoma since the sulphate mill began operation, although his experience as a practical operator goes back a score or more of years.

One man regards as the greatest recent advance, which he states has not yet been published, is made in the sulphite process—

"... the application for a patent of the 'Meeze Interaction Machine.' I saw a demonstration of this machine when in England. It can be used in the place of the Jenssen towers for the manufacture of sulphurous acid, occupies a small fraction of the space required for these towers, first cost considerably less, and gives absolute control over composition of acid produced, and effects a considerable saving in labor, as lime rock can be pumped into machine in disintegrated form. This machine, in my opinion, when introduced to the industry will create quite a sensation, as it also has other uses besides those mentioned above."

High Pressure Steam

Developments in the steam plant were regarded as highly important in most of the answers. As one engineer states the case:

"One is impressed by the efforts being made by various mills along the lines of improvement of their steam plants. For many years the paper industry, in common with many other industries, has been satisfied with its steam plant so long as it produced sufficient steam for power and process purposes. Now much greater attention is being paid to the cost of such steam and very considerable economies are being effected."

One man regarded as second only in importance to the Minton vacuum dryer—

"... the skinning of power from high pressure steam (600 lbs. and 200 lbs. per sq. in.) by means of a bleeder turbine and using the discharge for process steam."

Another views further heat economies in these words:

"Much attention has been paid in Europe and the eastern states to economic steam or heat consumption. The principles involved naturally apply very much to our Coast mills with the alterations which are due to the higher average temperature and the much higher humidity. The last named condition is especially deceiving if not properly taken into account."

Alpha Cellulose

"Further efforts have been made to economize the heat loss during cooking and dumping or blowing, but the apparatus necessary to greatly diminish this item is all rather expensive and on the Pacific Coast it may be cheaper at present to burn some more wood than to go into heavy expenses."

Among miscellaneous advancements and problems one executive stated that:

"The development of Alpha Cellulose has set a mark that other manufacturers must rise to."

One of the deepest students of the sulphite industry ventures that:

"Among the many problems which are always with us, is that of waste sulphite liquor utilization and disposal. While nothing has appeared in print relative to advances made during the past year, I have reason to believe that a process which promises success has been demonstrated on a sufficiently large scale to justify further installation."

Some regard as outstanding the development during the year of the heavy mechanical baler to compress pulp to the necessary minimum of 51 cu. ft. per ton. This was purely a Pacific Coast development, necessitated by a Pacific Coast problem of compressing pulp to a density sufficient enough to command the new low water freight rates.

A very able technician suggests as problems for further study:

"... the automatic temperature control of digesters and the development of a practical system of continuous bleaching."

It was surprising to note in these opinions contributed by practical operating men of the Coast the stress which nearly all of them put on the need for better wood utilization. One man puts it this way:

"The one big problem on the Pacific Coast which to my mind must be solved, is the economical utilization of both woods and mill waste, whether it be in the production of chemical pulp or for ultimate conversion into insulating board. Please note that I say the economical solution, for to my personal knowledge there are a number of cases where waste is costing more than round pulp wood."

And another view:

"The chief problems before the Pacific Coast sulphite industry are the economical barking of large size logs, the economic handling of small logs to the mill (now left in the woods), and an economic way of breaking down large logs, or—as an alternative—an economic way of producing cordwood is desirable. A profitable disposal of mill refuse is desirable, but is not a new problem."

Waste Is Biggest Problem

This next commentator also regards waste as the "biggest" problem. He goes further and points a possible way out for utilizing Douglas fir when he says:

"The biggest problem facing the industry in the Pacific Northwest is the successful use of Douglas fir, several hundred thousand cords of which are wasted every year at the saw mills of the Northwest. It cannot be used on the sulphite process, it cannot be used unless mixed with other woods on the soda process, and when used for kraft pulp, the pulp produced is inferior to hemlock."

"In my opinion the successful use of Douglas fir will be accomplished by cooking on the kraft process, and making bleached kraft out of it for use in high grade papers, as when cooked experimentally and bleached it gives a pulp that compares very favorably with bleached sulphite obtained from spruce."

Commenting on the practice developed during the year of making the chips in the forest instead of at the pulp mill one opinion is expressed that such practice would tend to—

"... remove chip making from the pulp mill's control. Rigid specifications as to size of chips would have to be enforced. Rescreening of chips at the mill would be necessary to see that specifications were met, for size is very important in sulphite pulp and directly affects the digester yield. Chips, more than logs or cords, would also be more apt to collect foreign matter."

In closing it might be suggested that possibly another contribution during the year 1928 to the technical progress of the industry, particularly as it pertains to the Pacific Coast, is the laying of a foundation for a Coast section of TAPPI, the ultimate motive of which is to pursue, on a cooperative basis, the further study of technical problems confronting the industry.

The Pulp and Paper Industry in 1928

UNITED STATES

Total 1928 wood pulp production—4,427,000 tons.
Total 1927 wood pulp production—4,313,394 tons.
Increase over 1927—2.6%.
Total 1928 pulp imports—1,701,250 tons.
Total 1927 pulp imports—1,639,177 tons.
Increase over 1927—3.8%.
Total 1928 exports of wood pulp—29,896 tons.
Total 1928 consumption of wood pulp—6,098,345 tons.
Increase over 1927—2.9%.
Total 1928 paper production, all grades (A. P. P. A. estimate)
—10,250,000 tons.
Total 1927 paper production, all grades—10,000,000 tons.
Increase over 1927—3.0%.
Rough valuation of paper production—\$1,500,000,000.
New paper machines installed—33.
Increased daily paper capacity—1,976 tons.
Increased yearly paper capacity—612,000 tons.
Capacity increase over 1927—5.0%.
Idle capacity of paper industry in 1928—23%.
Idle capacity of paper industry in 1927—20%.

WOOD PULP

Production by Grades:

Groundwood—1,470,000 tons. Decrease of 3.7% from 1927 output of 1,630,612 tons.
Bleached sulphite—732,869 tons. Increase of 8.0% over 1927 output of 678,573 tons.
Unbleached sulphite—872,331 tons. Decrease of 2.4% from 1927 output of 893,947 tons.
Sulphate, bleached and unbleached—730,800 tons. Increase of 17.4% over 1927 output of 622,784 tons.

Soda—521,000 tons. Increase of 6.1% over 1927 output of 487,478 tons.

Imports by Grades:

Groundwood—247,000 tons. Increase 0.6%.
Bleached sulphite—319,350 tons. Decrease 0.7%.
Unbleached sulphite—649,300 tons. Increase 8.8%.
Sulphate, bleached and unbleached—485,600 tons. Increase 2.3%.

Imports by Origin:

Bleached and unbleached sulphite: Canada 356,558 tons. Sweden 333,367 tons. Finland 94,278 tons. Norway 15,214 tons. Other countries 37,035 tons.
Sulphate, unbleached: Sweden 193,145 tons. Canada 139,945 tons. Finland 28,843 tons. Norway 15,214 tons. Other countries 4,109 tons.

PAPER

Production by Grades:

Newsprint—1,415,000 tons. Decrease of 70,000 tons from 1927.
Book paper—1,500,000 tons. Increase of 100,000 tons over 1927.
Wrapping (all grades)—1,600,000 tons. Increase of 75,000 tons over 1927.
Sulphite wrapping—860,000 tons. Decrease of 28,000 tons from 1927.
Kraft—740,000 tons. Increase of 103,000 tons over 1927.
Southern kraft—286,000 tons. Increase of 44,000 tons over 1927.

CANADA

Official figures on Canadian pulp and paper production are at this time unavailable, but export and import compilations give an indication of the trend of the Canadian industry.

Capital investment, pulp and paper, 1928 (estimated)—\$600,000,000.
Total combined exports chemical and mechanical pulp—863,806 tons.
Value of combined pulp exports—\$45,614,823.
Decrease in tonnage from 1927—15,349 tons.
Decrease in valuation from 1927—\$1,381,188.
Total combined value of pulp and paper exports in 1928—\$192,771,615.
Total combined value of pulp and paper exports in 1927—\$176,603,299.
Increase over 1927—\$16,168,316.

WOOD PULP

Export by Grades:

Mechanical: 1928—203,670 tons, value \$5,546,120.
1927—260,831 tons, value \$7,761,464.
Bleached Sulphite: 1928—251,453 tons, value \$19,112,964.
1927—237,288 tons, value \$18,407,169.
Unbleached Sulphite: 1928—214,127 tons, value \$10,738,977.
1927—192,559 tons, value \$10,269,560.

Sulphate: 1928—162,772 tons, value \$9,595,866.
1927—169,691 tons, value \$10,193,307.

PAPER

Exports by Grades:

Newsprint: 1928—2,206,587 tons, value \$141,103,527.
1927—1,881,867 tons, value \$123,222,094.
Wrapping: 1928—16,062 tons, value \$1,755,652.
Book: 1928—71,802 (cwts.), value \$588,671.
1927—99,870 (cwts.), value \$690,680.
Writing: 1928—6,892 (cwts.), value \$58,600.
1927—15,357 (cwts.), value \$124,787.

PULP WOOD

Exports in 1928—1,532,266 cords; value, \$16,269,660.
Exports in 1927—1,541,769 cords; value, \$15,702,705.

NEWSPRINT

Production in 1928	2,380,000 tons
Production in 1927	2,080,000 tons
Increased production	300,000 tons

SCANDINAVIAN COUNTRIES

NORWAY

Produced 529,000 metric tons of pulp.
Exported 404,000 tons.
Consumed 125,000 tons.
Principal exports: Bleached sulphite 132,000 tons, unbleached sulphite 121,000 tons, sulphate pulp 26,000 tons.

SWEDEN

Lockout decreased woodpulp production 19.5%.
Produced 1,910,685 tons against 2,047,765 tons in 1927.

Mechanical pulp production increased 95,426 tons. Total production for 1928 was 397,826 tons.
Exports—To the United States, 578,971 tons; to England, 412,027 tons; to all other countries, 531,994 tons.

FINLAND

Exports: Paper—22,578 metric tons.
Sulphite pulp—226,823 tons.
Sulphate pulp—100,257 tons.
Groundwood pulp—127,559 tons.
Boards—40,530 tons.

The Pulp Market

Its Trend As Seen By a Number of Executives
Who Are Concerned With Its Manufacture, Sale or Purchase

SEARCHING out the future of the pulp market seems only to add to confusion. One can find a wide range of outlook ranging from darkest pessimism to fair optimism. No one could be found who regarded the future as rosy, but the general average tone seems to be decidedly more hopeful than discouraging.

Because pulp manufacture is holding the eye on the Pacific Coast the question was put to a number of leaders in the industry, "What in your opinion, is the trend in the pulp market?" A number of interesting statements developed and, as they represent the views of pulp manufacturers, dealers, and buyers in both the United States and Canada they afford a fair cross-section of the industry.

As remarked above, there was no unanimous agreement. On several points, however, there seems to be a united stand. All agreed that the rapid development of the kraft industry was showing its effects on sulphite, disturbing the market and working into fields that had heretofore been considered quite exclusively sulphite. That the end is not yet in this direction is certain. Creating a similar disturbance is the newsprint industry with mushroom expansion upsetting equilibrium and forcing changes in grade for many mills. Further, the sharp decline in newsprint prices has tempted some news mills to work its wood inventories into sulphite pulp and thus add to the troubles of mills whose main business is producing pulp for sale. The curtailment of Swedish pulp production in the first quarter of 1929 was mentioned in nearly every case, but there was no general agreement on the effects of the so-called lock-out in stimulating prices. Most of those answering, however, felt that this production cut did help the market.

Constant Price Pressure

On this same point there was considerable comment about over-production. Closer analysis, however, seems to reveal that what is loosely termed over-production is really nothing more than an upset equilibrium. Such rapid and momentous changes are being made in the industry that a constant readjustment is necessary.

One man who has an excellent knowledge of both European and American conditions of production and sales ventures the following opinion:

"The trend of sulphite prices in 1928 was slightly downward, and I believe this trend will continue during a part of 1929. The Scandinavian mills at the close of the year had sold about 50% of their production for 1929, but this is not necessarily a bullish argument as it is common practice in Scandinavia to sell pulp long in advance.

"Conditions in the paper industry, however, are forcing constant price pressure and buyers seem to hope generally to buy their pulp cheaper in 1929 than they did in 1928. Advances in price are not looked for in 1929, although I do not expect them to go lower, but it seems to be a part of the cycle of business that pulp prices will remain low in 1929.

"The Swedish lockout took about 200,000 tons off the market, but this caused neither shortage nor price stimulation. With this subtracted tonnage in the market again this year I do not see just how the market is going to absorb it. If the English buyers of Scandinavian pulp should take more pulp this year it may tend to firm prices, but they would have to buy heavily to make much impression on the world market.

"Production on the Pacific Coast and in Finland is increasing, and while it is true that sulphite consumption is increasing, it is my belief that world supply will be greater than demand during the present year and under such conditions prices will probably not advance."

Paper Business Off

One of the most prominent operators ventures the opinion that the market will hold good during the first half of 1929, but he expects that all grades will tend to fall off in price in the second half of the year. Growth of the kraft industry was mentioned in this case as an important contributing cause to sulphite decline.

Another man points out that pulps selling at \$2.60 ex-dock Atlantic Coast in 1927 are now off to \$2.50 for 1929 shipment and declines in other grades are comparable. This executive could see no signs of better prices and was even inclined to expect further depressions.

"The reason," he points out, "is due principally to poor business with the paper mills, but some of the blame must be placed upon an over-production both of unbleached sulphite and kraft pulps."

In another case it was pointed out that despite the loss of 3½ months production in the Swedish mills kraft pulp refused to brace up, but declined instead from \$2.65 in early 1928 to \$2.50 for 1929 shipment, ex-dock Atlantic prices.

Sees Stability

One note of more optimistic trend is expressed as follows:

"The outlook for sulphite pulp prices in the immediate future is one of stability. Demand for bleached sulphite continues strong and there may be a slight increase in prices here, but unbleached sulphite is ap-

parently out of line. With news print mills able to meet market requirements for strong pulp in the face of a crisis in their own trade and a market sufficiently attractive it is doubtful if price improvement here can be looked for. This tendency may also hold down prices on bleached sulphite. If we look ahead somewhat I think we have reason to hope for better prices in all grades, but with new production coming in the trend will be to keep bleached prices down and offer less spread between bleached and unbleached prices."

Another executive does not view the prospects of bleached pulp so brightly. "It may maintain its position for a time," he believes, "but with some of the mills adding bleach plants the trend will be to relieve the temporary seller's market in bleached pulp."

This man suggests further that the outlook is not at all bright for unbleached pulp and looks for lower prices, stating in the same breath that the market on unbleached pulp was already so low that right now it was a problem to make ends meet.

Some bitter criticism was directed in some of the replies against new mills which had recently come into production and opened their market by cracking the price. This practice was termed as entirely unnecessary in most cases and it was pointed out that it was mighty easy to lop the price, but an entirely different matter to shove it up again, which, of course, was a part of the original scheme. Furthermore, it was stated, the low price usually branded the pulp as an inferior grade right at the very start and left a stigma upon the brand that was hard to shake off later on.

Kraft Supplants Sulphite

"With the rapid advent of kraft paper in the Eastern markets," another executive suggests, "and promise of still larger production in this line to supplant sulphite papers, I would not care to invest my money in sulphite mills at the presents."

In this reply a suggestion of changing conditions was offered, as follows: "Bleached sulphite would seem to be a doubtful factor. Although there is an increased demand from Rayon manufacturers for certain grades, and a number of mills are using their product in making paper at their own mills, experiments are now going on which may result in new processes and new methods that will depress prices of bleached sulphite." Just what these experiments were the writer did not venture to say.

In another case the writer agrees that the pulp market is not following the dope book. Opinion in this instance comes from a man who has had an unusually wide experience. He has, in his years of experience, been at different times manufacturer, buyer and broker of pulp and his knowledge of the business touches both the American and Northern European continents.

Agreeing with others that the Swedish mills had already sold half or more of 1929 production of all grades, unbleached and bleached sulphite and kraft, he remarks:

"Notwithstanding, you can buy unbleached sulphite or kraft pulp at a price which hardly covers the cost of same. England and the Continent seem to have purchased more tonnage ahead than ever before, but still prices remain down."

Not According to Hoyle

The market simply isn't following the rules, he points out, and continues:

"Everything points, if we consult records of past years, to a good market and higher prices on sulphite, but those closely connected do not feel that this will be the case. I believe it is the feeling of those who should know that while prices will remain firm for first open water shipments from Scandinavia, and perhaps into June or July, pulp will go lower than today's quotations. This is in the face of heavy sales already made."

Another market factor sometimes overlooked is expressed as follows:

"Another factor to be considered is that many paper mills which are pulp buyers, unless operating on a cost-plus basis, do not know how they are going to operate and on what grade. Orders for paper come in from hand to mouth and their pulp purchases are made in the same spasmodic fashion.

A market factor sometimes overlooked is brought out in one reply. This writer was searching for trends lying deeper than mere prices, increased production and stocks on hand. He believes that:

"* * * paper mills are coming more and more under chemical control. This means that mills making certain grades of paper find they can do best with certain grades of pulp and naturally they try to stick to these grades. Their purchases are made on definite, non-varying quality. This takes care of the specialty pulp. But there are other paper mills which find that any one of a half dozen or more mills can supply pulps suitable for their purpose. Then quality, of course, is made secondary to price.

While on this point of the increasing importance of technical control it seems proper to stress the fact that the rule-of-thumb is giving way to the modern thought of "know exactly what you are doing, and why." It seems that the day is dawning when the chemist will be really given the job and the responsibility for which he is trained, that is, not to make routine tests on the end product, but to determine instead with the application of his scientific knowledge just what that end product is to be.

Pulp With Specifications

It is interesting in this connection to note that some pulp mills are making rapid progress in this line. They are offering their paper mill customers not mere batches of pulp, but a certain product with specifications, even as a number of other commodities are being sold today. The paper mill buying this pulp receives with its purchase a specification sheet for the lot on which is recorded the essential data regarding the manufacture of that particular lot. The paper maker can consult this specification sheet and know in advance just how that pulp is going to react. The result is that a lot of time and money is saved in making that pulp into paper. It is extremely interesting to note that the pulp mills adopting this practice have been able to book an unusual share of the tonnage with much less regard for price than concerns the non-technical neighbor.

Summing up the numerous forecasts we can present a composite opinion contributed by representative leaders of the industry to the effect that 1929 should be a year of higher prices on pulp later on, but do not look for prices to soar much above the present level. The paper business is too close to the bottom to be stamped into paying higher prices for pulp.

The Pulp Outlook

An interview with

LAWRENCE B. KILLAM

President, B. C. Pulp & Paper Co., Ltd.

The present year should witness a definite stiffening of pulp prices and the general tendency in that direction has already made itself felt. There is general agreement in the trade that prices have been too low in the past for satisfactory operation and the swing-back to more favorable levels is inevitable. Whether or not there has been a wide disparity between supply and demand during the past period of depression, there is little doubt that demand has now just about caught up with or passed the supply.



LAWRENCE B. KILLAM

The past year, as a matter of fact, has not been an unusual one, except in the matter of price depression. There have been no wide fluctuations in price, however, no far-reaching expansion in markets, little new construction in the B. C. pulp mills and general trade conditions remain unchanged. But lately a rise in the demand for high grade sulphite has been apparent and this will probably become more and more perceptible as the present year advances. Bleached pulp appears to be on a stronger market basis than a year ago.

The Orient is one of the chief markets for pulp from British Columbia. A great deal depends on the political situation in the Far East when we attempt to analyze our trade prospects there, and political conditions in Japan as well as in China are so charged with uncertainty that it is impossible to hazard much more than a guess. However, there is nothing in the political sky at present which indicates any drastic change in the market for pulp in that territory.

Every once in a while we are threatened with an increased tariff in Japan, but so far this has not materialized. We will probably hear more about it when the Diet assembles for its spring session and by that time it is probable that the special commission which has been investigating the question of tariff changes will have its report ready. What action the govern-

ment will take is as uncertain now as in the nature of the recommendation to be made by the commission. Our own investigations have assured us that the demand in the Far East for pulp will be fair for the next two or three years. In a geographical sense our chief competitor might be Russia, but the Siberian pulp trade is so inadequately organized that we do not need

to fear anything from that quarter at present.

Regarding the United States tariff the situation is similarly uncertain. Under present conditions our own company has been able to compete in the eastern United States market and in many cases orders have been placed with us at prices in line with the market for superior grades of pulp, and we do not anticipate trouble in continuing to make sales in that territory.

REVIEW OF THE PULP AND PAPER INDUSTRY

in British Columbia—1919-1928

Official pulp and paper production figures for British Columbia show consistent increases for 1928 in all grades of pulp and paper.

The following table gives the official production figures since 1919:

	—PULP—			—PAPER—	
	Sulphite	Sulphate	Groundwd	News Print	Other
1928	120,413	15,050	170,005	225,477	15,960
1927	119,005	13,700	163,548	214,010	13,745
1926	108,381	15,000	136,123	176,924	10,389
1925	92,514	16,856	121,363	148,201	9,261
1924	89,859	14,403	112,001	136,281	9,653
1923	99,878	9,932	107,266	142,928	7,709
1922	86,894	9,674	100,759	124,639	7,945
1921	68,502	6,519	89,725	110,176	6,934
1920	92,299	16,380	108,655	136,832	9,792
1919	80,347	9,473	99,769	123,607	7,202

	Total Production All Grades—Tons		Estimated value of production:
	Pulp	Paper	
1928	305,468	241,437	\$16,755,000
1927	296,253	227,755	18,505,000
1926	259,504	187,313	16,315,000
1925	230,733	157,462	14,466,000
1924	216,243	145,934	13,938,000
1923	217,076	150,637	15,018,000
1922	197,327	132,584	12,590,000
1921	164,746	117,110	13,500,000
1920	217,334	146,624	
1919	189,589	130,809	

PULP AND PAPER EXPORTS

Loaded at Ocean Falls, Powell River, Swanson Bay, Port Alice, Woodfibre and Vancouver

(Compiled by Vancouver Merchants' Exchange)

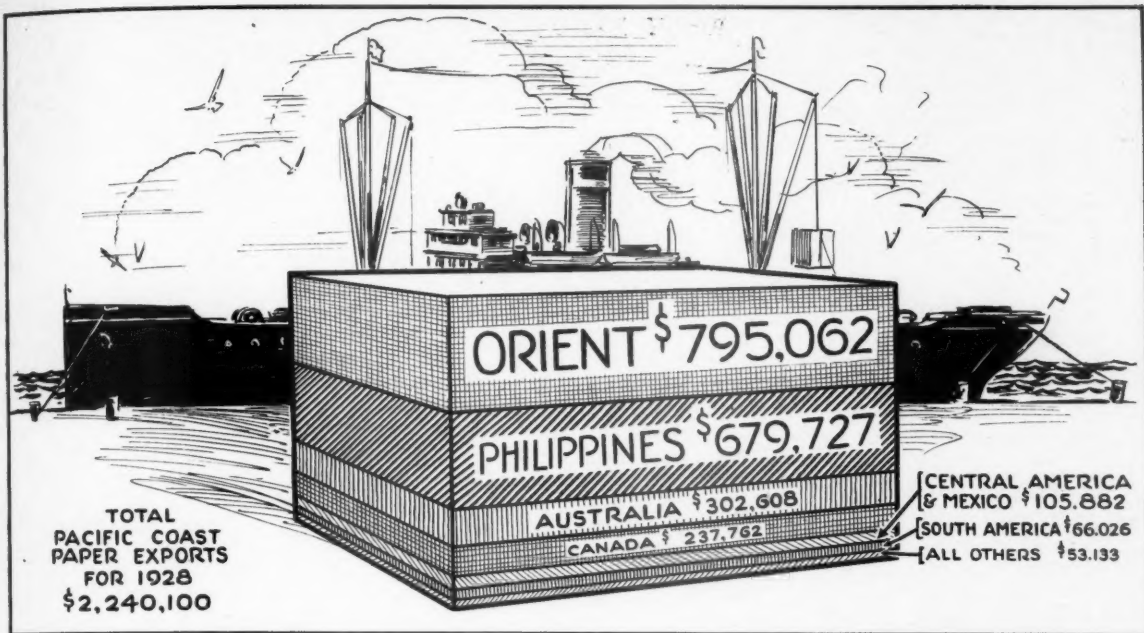
Destination—	1925	1926	1927	1928
Australia	2,115	13,950	18,226	14,550
Central and South America	11,000	10,256	9,437	1,667
China			80	35
Japan	*25,884	*41,823	53,244	57,230
New Zealand	11,890	10,560	8,702	20,548
United States	157,233	158,917	152,002	172,017
Argentina				34,045
Other Countries			1,980	1,119
Total short tons	208,112	235,506	243,671	301,211

*Chinese and Japanese figures combined in 1925 and 1926.

PULP WOOD IMPORTED INTO WASHINGTON*—1921-1928

	Rough		Peeled		Rosseed	
	Cords	Dollars	Cords	Dollars	Cords	Dollars
1921	11,923	74,339	512	2,454		
1922	6,238	37,388	1,395	8,857	43	189
1923	15,996	89,590	3,968	26,963	108	561
1924	9,298	83,739	18,257	179,347	209	3,111
1925	6,496	61,390	17,064	140,043	284	2,937
1926	2,826	26,510	13,438	89,310	125	1,375
1927	3,527	27,530	9,235	53,896		
1928†	8,062	56,477				

*No pulpwood was entered at the other Pacific Coast customs districts.
†Includes all grades for the first 10 months in 1928.



PAPER EXPORTS FROM U. S. PACIFIC COAST PORTS—1928

Recapitulation Showing Total Exports by Commodities and Countries of Destination.

	Newsprint Dollars	Printing Dollars	Writing Dollars	Greas- proof Dollars	Wrapping Dollars	Tissues Dollars	Boxbrd Dollars	Other Paper & Stwbrd. Dollars	Paper Bgs Dollars	Boxes & Cartons Dollars	Total Value Export to Ea. C'ntry Dollars
To the Orient	127,012	56,401	27,320	6,519	130,757	27,652	348,818	29,275	10,397	30,911	795,062
To Philippines	259,656	112,318	48,263	17,867	132,713	14,272	35,445	2,446	47,642	9,105	679,727
To Australia	6,897	31,044	66,456	923	50,023	11,372	128,363	3,931	1,786	1,813	302,608
To Canada	1,779	89,229	19,170	3,724	15,847	16,263	67,182	14,164	4,192	10,212	237,762
To Central America	3,827	18,662	28,202	651	2,010	2,422	6,330	422	876	465	63,867
To Mexico	995	1,454	4,857	665	14,376	8,370	7,186	491	2,376	1,145	41,915
To Brazil	3,280	5,378	11,238	—	—	—	—	—	—	—	19,896
To Venezuela	988	3,225	589	—	—	45	—	75	—	16	4,938
To Colombia	765	897	3,916	277	162	210	203	152	41	115	6,738
To Other South American	5,951	—	12,505	—	—	3,933	9,255	91	2,519	200	34,454
To Europe	—	55	33	—	—	25	—	—	—	230	343
To All Others	1,544	2,706	15,023	11,023	434	498	18,531	1,217	1,602	212	52,790
Total, each commodity	412,694	321,369	233,572	41,649	346,347	85,037	621,313	52,264	71,431	54,424	2,240,100
Grand total											2,240,100

This table covers the full 12 months of the calendar year 1928.

PULP EXPORTS—1922-1928

Exported from U. S. Ports on the Pacific Coast

	OTHER WOOD PULP				Oregon		Washington		Total	
	Los Angeles Tons	Dollars	San Francisco Tons	Dollars						
1922	—	—	—	—	—	—	3	359	3	359
1923	—	—	—	—	1,000	23,000	59	2,337	1,059	25,377
1924	—	—	56	2,798	—	—	1	45	57	2,843
1925	—	—	38	1,080	—	—	2	123	40	1,203
1926	1	81	19	538	—	—	3	150	23	769
1927	—	—	17	554	—	—	763	12,088	780	12,642
1928†	—	—	50	3,895	—	—	696	22,195	746	26,090
SULPHITE										
1926	—	—	—	—	1	43	—	—	1	43
1927	—	—	—	—	45	2,100	286	17,450	331	19,550
1928†	—	—	—	—	—	—	672	35,663	672	35,663
SODA										
1925	—	—	353	30,312	—	—	—	—	353	30,312
1927	—	—	250	20,922	—	—	—	—	250	20,922
1928†	—	—	98	7,760	—	—	—	—	98	7,760

†Figures for 1928 include movements from Jan. 1 to Oct. 31.

PAPER EXPORTS—1928

From U. S. Pacific Coast Customs Districts

January 1 to October 31

Read "thousand" (i. e., add "000") after all figures denoting pounds.

	Newsprint		Printing		Writing		Greaseproof		Wrapping	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
From Los Angeles	2	300	2	488	5	1,552	*	13	234	18,429
To Mexico	2	300	2	488	4	1,098	*	13	80	6,332
To Canada					1	150				
To Australia					*	20			152	11,927
To Orient					*	96			2	170
To South America					*	50				
To Central America					*	138				
From San Francisco	2,051	76,904	603	38,466	721	40,555	238	14,926	1,504	90,684
To Mexico	14	662	5	542	7	635	3	568	46	3,439
To Australia	34	1,521	150	11,366	41	1,824	4	404	310	31,068
To Philippines	653	25,420			17	1,781	7	867	361	16,178
To Orient	1,205	44,518	96	5,512	5	1,505	8	1,326	761	37,291
To Central America	125	3,697	211	11,529	279	14,201	4	651	17	1,958
To Venezuela	19	988	59	3,116						
To Canada			18	2,746	6	931	1	75	7	579
To Colombia							*	12	1	107
To Brazil			19	967	84	3,905			*	25
To Germany										
To Other South America	1	100			8	386				
To All Others			45	2,688	274	14,387	211	11,023	1	39
From Oregon	5,872	242,575	528	28,104	2,124	101,793	136	13,495	2,576	115,793
To Australia	83	3,779	101	4,813	716	36,666				
To Canada					27	*				
To Philippines	4,656	198,554	236	12,305	866	43,481	135	13,320	1,952	87,473
To Orient	898	34,391	152	8,500	351	12,598	1	175	624	28,320
To Colombia			1	146						
To Brazil			38	2,313	31	1,473				
To Other South America	235	5,851			160	7,575				
From Washington	173	8,006	2,706	177,485	203	16,850	57	6,579	361	26,800
To Canada	24	1,689	714	56,891	125	10,743	19	2,855	251	12,979
To Australia	24	1,597	212	14,403	67	3,871	2	519	2	64
To Philippines	118	4,176	1,244	72,080	6	307	36	3,205	50	5,320
To Orient			535	34,038	2	1,120			57	8,396
To Europe			1	55						
To All Others	7	544		18	3	609			1	41
Total Pacific Coast	8,098	327,785	3,939	244,543	3,053	160,750	431	35,013	4,675	251,706

*For convenience the last three "000's" have been omitted in figures denoting pounds, and the figure given is the nearest thousand. The asterisks denote small quantities of less than 500 pounds, and value only is given.

PAPER EXPORTS—1928

From U. S. Pacific Coast Customs Districts

January 1 to October 31

Read "thousand" (i. e., add "000") after all figures denoting pounds.

	Tissues		Box Board		Other Paper & Strawbrd		Paper Bags		Boxes & Cartons	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
From Los Angeles	104	9,387	481	16,881	3	227	17	1,411	10	1,118
To Mexico	49	6,479	86	3,713	3	227	16	1,305	9	1,028
To Philippines	7	875								
To Australia	45	1,552	227	7,616			1	73	*	10
To Orient	1	142	104	2,984			*	33		
To Central America	2	309								
To South America	*	20	64	2,568						
To All Others	*	10							1	80
From San Francisco	331	42,708	9,552	326,809	454	25,960	402	28,882	270	32,919
To Canada	12	3,288	11	3,644	16	2,102	39	3,023	27	4,460
To Mexico	7	720	16	1,460	2	119	7	911	*	15
To Australia	23	3,142	2,352	89,726	50	3,117	13	1,370	2	845
To Philippines	70	7,982	237	11,035	21	1,990	257	17,184	75	5,935
To Orient	112	21,425	6,258	194,919	333	17,102	60	4,290	163	20,978
To Colombia	1	151	1	203			1	41	*	115
To Venezuela	*	35			*	75			*	16
To Other South America	86	3,913	135	4,992	2	91	*	54	1	160
To Central America	14	1,587	13	3,215	1	147	7	843	*	85
To Germany									*	45
To Other European									1	135
To All Others	6	465	529	17,615	29	1,217	18	1,166	1	132
From Oregon	37	4,483	4,682	104,192	67	2,605	376	20,138	8	1,137
To Australia	37	4,483								
To Philippines			776	17,724			285	14,763		
To Orient			3,906	86,468	67	2,605	91	5,375	8	1,137
From Washington	166	16,078	3,021	95,973	358	17,667	13	1,279	71	4,969
To Australia			*	22						
To Canada	112	10,057	1,548	56,256	298	11,030	10	919	65	3,219
To Orient	16	3,068	1,420	37,000	60	6,637	3	360	4	213
To Philippines	38	2,953	49	2,561					2	1,537
To All Others			4	134						
Total Pacific Coast	638	72,656	17,736	543,855	882	46,459	808	51,710	359	40,143

*For convenience the last three "000's" have been omitted in figures denoting pounds, and the figure given is the nearest thousand. The asterisks denote small quantities of less than 500 pounds, and value only is given.

PAPER EXPORTS—1922-1928*

From U. S. Pacific Coast Customs Districts

	LOS ANGELES		SAN FRANCISCO		OREGON		WASHINGTON		TOTAL	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
NEWSPRINT										
1922			1,245,000	64,000	5,282,000	243,000	579,000	29,000	7,106,000	336,000
1923	10,000	600	526,000	30,000	2,833,000	129,000	1,072,000	58,000	4,441,000	217,600
1924	17,000	1,000	607,000	46,000	2,487,000	108,000	1,731,000	96,000	4,842,000	251,000
1925	18,000	1,000	460,000	23,000	11,914,000	503,000	1,065,000	54,000	13,457,000	581,000
1926	14,000	1,000	3,209,000	137,000	12,756,000	583,000	406,000	22,000	16,385,000	743,000
1927	26,000	1,000	614,000	33,000	6,962,000	286,000	604,000	35,000	8,106,000	355,000
1928*	2,000	300	2,051,000	77,000	5,872,000	242,000	173,000	8,000	8,098,000	327,300
PRINTING†										
1922	400	50	36,000	5,900	2,000	200	2,388,000	182,000	2,426,400	188,150
1923	800	130	156,000	16,000	3,000	400	1,519,000	126,000	1,678,800	142,430
1924	1,600	150	553,000	47,000	600	100	555,000	48,000	1,110,200	95,250
1925	7,000	900	194,000	19,000	700	400	615,000	52,000	816,700	255,000
1926	4,000	1,000	625,000	47,000	114,000	7,000	611,000	51,000	1,311,000	106,000
1927	4,000	600	567,000	45,000	1,133,000	57,000	1,117,000	25,000	2,821,000	127,600
1928*	2,000	500	603,000	39,000	528,000	28,000	2,706,000	177,000	3,939,000	244,500
WRITING‡										
1922	5,000	800	289,000	50,000	—	—	857,000	85,000	1,151,000	135,800
1923	7,000	3,000	229,000	37,000	32,000	3,000	641,000	67,000	909,000	110,000
1924	13,000	4,000	125,000	21,000	2,000	1,000	706,000	64,000	846,000	90,000
1925	25,000	10,000	32,000	8,000	—	—	216,000	21,000	273,000	39,000
1926	13,000	5,000	33,000	12,000	108,000	6,000	353,000	49,000	507,000	72,000
1927	12,000	3,000	112,000	20,000	13,000	1,000	116,000	18,000	233,000	42,000
1928*	5,000	2,000	721,000	40,000	2,124,000	101,000	203,000	17,000	3,053,000	160,000
GREASEPROOF										
1922	600	50	7,000	1,000	2,000	300	7,000	600	16,600	1,950
1923	—	—	72,000	8,000	—	—	16,000	2,000	88,000	10,000
1924	—	—	74,000	5,000	8,000	1,000	4,000	—	86,000	6,600
1925	2,000	200	91,000	12,000	20,000	2,000	54,000	7,000	167,000	21,200
1926	800	70	71,000	8,000	41,000	4,000	28,000	4,000	140,800	16,070
1927	450	80	256,000	29,000	101,000	10,000	17,000	4,000	374,450	43,080
1928*	341	13	238,000	15,000	136,000	13,000	57,000	7,000	431,341	35,013
KRAFT WRAPPING¶										
1922	—	—	17,000	2,000	—	—	42,000	3,000	59,000	5,000
1923	8,000	800	34,000	4,000	—	—	—	—	42,000	4,800
1924	2,000	200	15,000	1,000	—	—	500	60	17,500	1,260
1925	7,000	500	10,000	1,000	125,000	8,000	6,000	2,000	148,000	11,500
WRAPPING¶										
1922	12,000	2,000	877,000	66,000	139,000	8,000	372,000	20,000	1,400,000	96,000
1923	47,000	5,000	560,000	41,000	275,000	15,000	557,000	27,000	1,439,000	88,000
1924	31,000	2,000	433,000	32,000	146,000	9,000	669,000	36,000	1,279,000	79,000
1925	49,000	4,000	627,000	41,000	1,085,000	58,000	35,000	26,000	2,116,000	129,000
1926	82,000	5,000	1,387,000	78,000	1,986,000	109,000	105,000	7,000	3,561,000	199,000
1927	280,000	21,000	1,157,000	65,000	1,659,000	83,000	122,000	11,000	3,218,000	180,000
1928*	234,000	18,000	1,504,000	91,000	2,576,000	116,000	360,000	27,000	4,674,000	252,000
TISSUES§										
1922	6,000	900	201,000	30,000	—	—	196,000	30,000	403,000	60,900
1923	18,000	2,000	198,000	27,000	800	400	114,000	15,000	330,800	44,400
1924	29,000	4,000	327,000	37,000	34,000	4,000	248,000	32,000	638,000	77,000
1925	32,000	4,000	265,000	36,000	—	—	254,000	30,000	551,000	70,000
1926	27,000	3,000	309,000	44,000	—	—	157,000	27,000	493,000	74,000
1927	38,000	4,000	340,000	58,000	50	10	147,000	22,000	525,550	84,010
1928*	104,000	9,000	331,000	43,000	37,000	4,000	166,000	16,000	638,000	72,000
BOXBOARD§§										
1922	—	—	—	—	—	—	—	—	—	—
1923	—	—	—	—	—	—	—	—	—	—
1924	—	—	—	—	—	—	—	—	—	—
1925	1,328,000	35,000	4,454,000	206,000	—	—	1,129,000	43,000	6,911,000	284,000
1926	2,855,000	66,000	11,744,000	325,000	—	—	1,971,000	70,000	16,570,000	461,000
1927	763,000	18,000	10,166,000	312,000	25,000	700	3,461,000	108,000	14,415,000	438,700
1928*	481,000	17,000	9,552,000	327,000	4,682,000	104,000	3,021,000	96,000	17,736,000	544,000
OTHER PAPER BOARD AND STRAWBOARD										
1922	99,000	5,000	11,891,000	524,000	—	—	2,270,000	88,000	14,260,000	617,000
1923	5,000	500	12,885,000	503,000	—	—	2,578,000	118,000	15,468,000	621,500
1924	2,351,000	70,000	15,663,000	509,000	47,000	2,000	1,115,000	46,000	19,176,000	627,000
1925	28,000	1,000	916,000	58,000	—	—	262,000	17,000	1,206,000	76,000
1926	9,000	500	214,000	35,000	100	10	365,000	15,000	588,100	50,510
1927	7,000	300	440,000	34,000	14,000	500	1,050,000	32,000	1,511,000	66,800
1928*	3,000	300	454,000	26,000	67,000	3,000	358,000	18,000	882,000	47,300
PAPER BAGS										
1922	—	—	277,000	29,000	35,000	4,000	72,000	7,000	384,000	40,000
1923	12,000	2,000	222,000	27,000	300	50	133,000	12,000	367,300	41,050
1924	21,000	2,000	451,000	36,000	—	—	31,000	3,000	503,000	41,000
1925	30,000	3,000	510,000	32,000	47,000	3,000	74,000	5,000	661,000	43,000
1926	32,000	3,000	755,000	55,000	10,000	800	51,000	4,000	848,000	62,800
1927	34,000	3,000	459,000	37,000	334,000	21,000	23,000	2,000	850,000	63,000
1928*	17,000	1,000	403,000	29,000	376,000	20,000	13,000	1,000	809,000	51,000
BOXES AND CARTONS										
1922	2,000	200	150,000	18,000	—	—	69,000	8,000	221,000	26,200
1923	1,000	300	89,000	14,000	500	300	12,000	11,000	102,500	25,600
1924	2,000	500	286,000	77,000	—	—	96,000	13,000	384,000	80,500
1925	2,000	300	197,000	21,000	—	—	48,000	7,000	247,000	28,300
1926	8,000	1,000	275,000	32,000	1,000	100	269,000	21,000	553,000	54,100
1927	8,000	1,000	186,000	20,000	5,000	1,000	77,000	8,000	276,000	30,000
1928*	10,000	1,000	270,000	33,000	8,000	1,000	71,000	5,000	359,000	40,000

*January 1 to October 31.

Figures in this table have been simplified by reduction to the nearest thousand, except in the case of small items of less than 1,000 pounds or less than \$1,000.

†"Printing" also includes book (coated and not coated) and cover paper.

‡"Writing" includes papeteries and other writing.

§"Tissues" include tissues, crepe, toilet, napkins, towels, etc.

§§"Boxboard" includes bristol, sheathing and building paper.

¶Kraft wrapping for 1926, 1927 and 1928 are included in "wrapping".

PACIFIC PULP & PAPER INDUSTRY

UNITED STATES PULP AND PAPER EXPORTS—1922-1927

Add "000" to all figures for both quantity and dollars

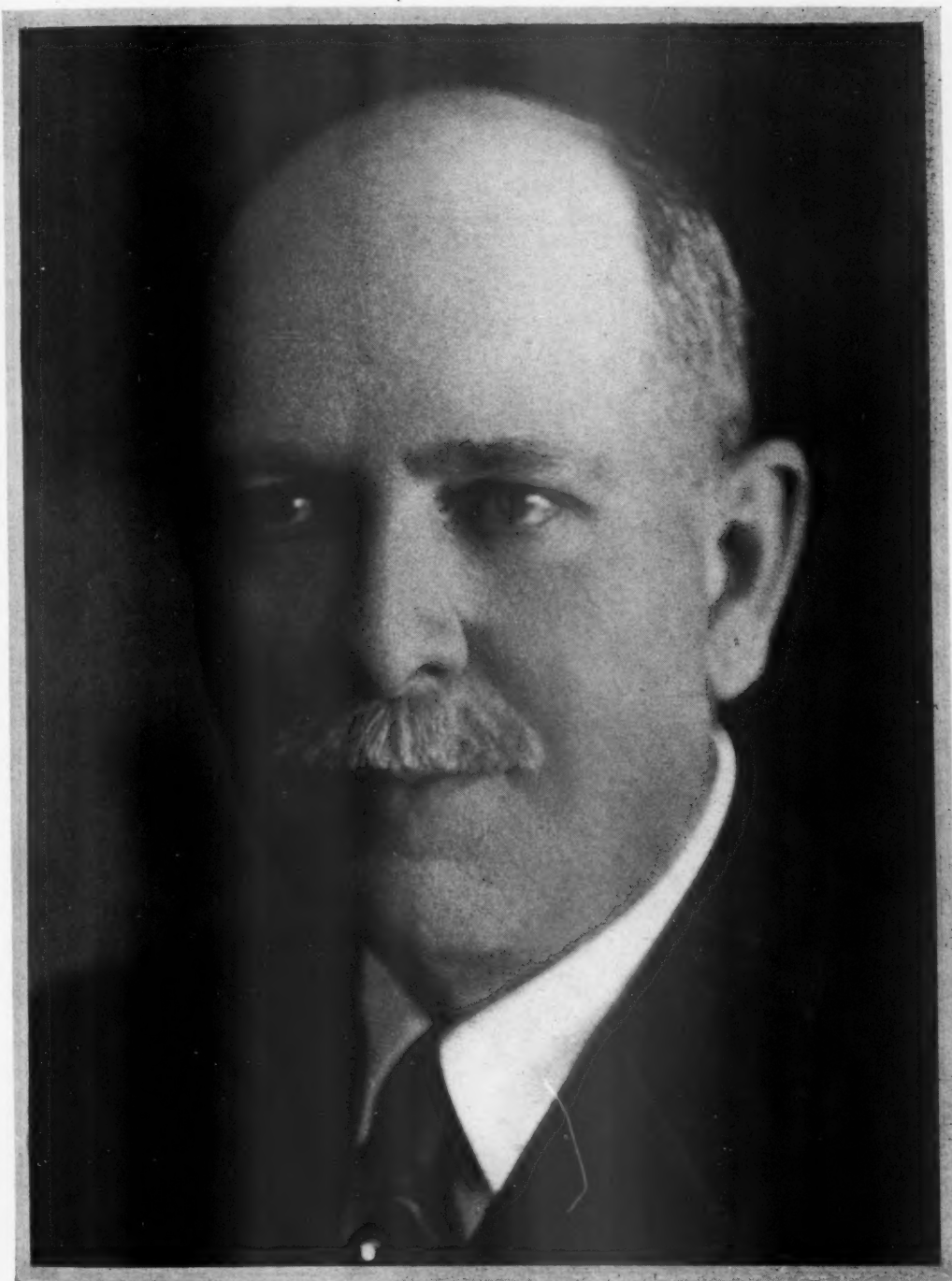
Unit of Quantity	—1922—			—1923—			—1924—			—1925—			—1926—			—1927—		
	Quantity	Dollars	Quantity	Quantity	Dollars	Quantity	Quantity	Dollars	Quantity	Quantity	Dollars	Quantity	Quantity	Dollars	Quantity	Quantity	Dollars	
Pulpwood.....	20	191	8	72	17	137			67	13	114				59		485	
Wood Pulp.....	16	809	15	851	21	12,561			23	1,362	1,346				24		1,266	
Sulphite.....	3	270	3	287	2	182			2	22	113				2		16	
Soda.....	3	108	3	157	6	603			9	856	606				2		91	
Other Wood Pulp.....	2																	
Printing Paper—																		
Newsprint.....	51,528	2,338	32,715	1,637	34,317	1,773	45,476	2,025	38,516	18,085	1,722	16,044	24,637	1,191				
Bookpaper, not Coated.....	29,200	2,829	26,598	3,001	18,582	2,079	17,348	1,935	18,085	1,722	16,044	24,637	1,191					
Cover Paper.....	1,585	225	1,197	210	840	162	1,215	231	1,560	269	1,631	283						
Grassproof.....			1,641	220	1,567	165	2,115	282	2,419	354	2,613	380						
Wrapping.....							28,736	2,173	33,015	2,234	33,212	2,256						
Kraft.....	815	68	873	80	639	73												
Other Wrapping.....	32,237	2,098	25,874	2,097	24,420	1,968												
Surface Coated.....	3,765	565	3,974	606	3,358	506	3,802	562	5,903	745	745	745			5,973		768	
Tissues.....	8,612	1,391	9,209	1,698	8,736	1,526	10,404	1,906	11,702	2,023	2,023	2,023			12,690		2,092	
Paper Board and Strawboard.....	49,087	2,101	56,294	2,678	71,136	2,771	32,375	1,581	40,313	2,030	2,030	2,030			21,494		2,972	
Paper Bags.....	11,683	1,055	8,741	880	10,414	959	12,881	1,134	11,534	1,024	1,024	1,024			12,659		1,628	
Boxes and Cartons.....			10,879	1,056	13,642	1,180	17,095	1,301	19,866	1,435	1,435	1,435			23,659		1,628	
Boxboard.....							22,482	796	52,469	1,502	1,502	1,502			43,633		1,351	

UNITED STATES PULP AND PAPER IMPORTS—1922-1927

Add "000" to all figures for both quantity and dollars

Unit of Quantity	—1922—			—1923—			—1924—			—1925—			—1926—			—1927—		
	Quantity	Dollars	Quantity	Dollars	Quantity	Dollars	Quantity	Dollars	Quantity	Dollars	Quantity	Dollars	Quantity	Dollars	Quantity	Dollars		
Pulpwood—																		
Rough	225	2,261	375	3,471	2,790	2,790	268	2,790	321	3,220	3,220	367	3,633	3,633	431	4,240		
Peel	707	7,216	855	8,419	8,708	8,708	886	8,708	1,019	10,238	10,238	928	9,438	9,438	1,074	11,014		
Roused	113	1,526	118	1,516	1,610	1,610	126	1,610	89	1,671	1,671	89	1,105	1,105	91	1,250		
Wood Pulp—																		
Mechanically Ground	103	5,707	268	9,297	7,190	7,190	230	7,190	296	8,417	8,417	271	8,278	8,278	219	3,961		
Unbleached Sulphite	423	22,257	462	26,548	30,082	30,082	522	30,082	579	32,442	32,442	629	37,052	37,052	613	34,263		
Bleached Sulphite	213	17,996	251	22,246	21,006	21,006	272	21,006	287	22,528	22,528	295	23,678	23,678	311	24,224		
Soda	1	37	5	343														
Sulphate (Kraft)	276	16,085	234	15,229	15,915	15,915	278	15,915	306	18,257	18,257	335	21,193	21,193	341	20,684		
Sulphate Bleached	19	1,170	15	1,081	1,550	1,550	28	1,550	17	990	990	16	1,049	1,049	10	709		
Other Pulp	1	15	1	49	125	125	2	125	2	152	152	4	256	256	3	244		
Printing Paper—																		
Newsprint	2,058,536	72,314	2,617,686	98,021	2,714,467	101,297	2,896,850	103,717	3,701,350	123,982	123,982	3,974,129	131,489					
All Other	5,198	320	16,794	831	26,711	1,126	16,611	809	16,376	827	827	10,420	512					
Greaseproof	605	50	3,208	296	1,432	161	2,279	289	2,227	383	383	1,622	262					
Wrapping	65,831	2,734	88,012	3,906														
Kraft																		
All Other																		
Surface Coated	925	232	1,157	309	28,217	1,090	14,420	606	8,868	391	391	12,197	517					
Issues	472	180	2,036	917	21,433	841	5,550	531	5,556	367	367	12,914	336					
Other Paper Boards	6,103	171	24,801	722	1,946	926	2,714	1,164	2,882	1,405	1,405	3,231	912					
Boxes					31,497	986	30,328	746	40,222	916	916	2,503	827					
					1,830	1,179	2,329	1,350	2,104	965	965	2,503	1,446					

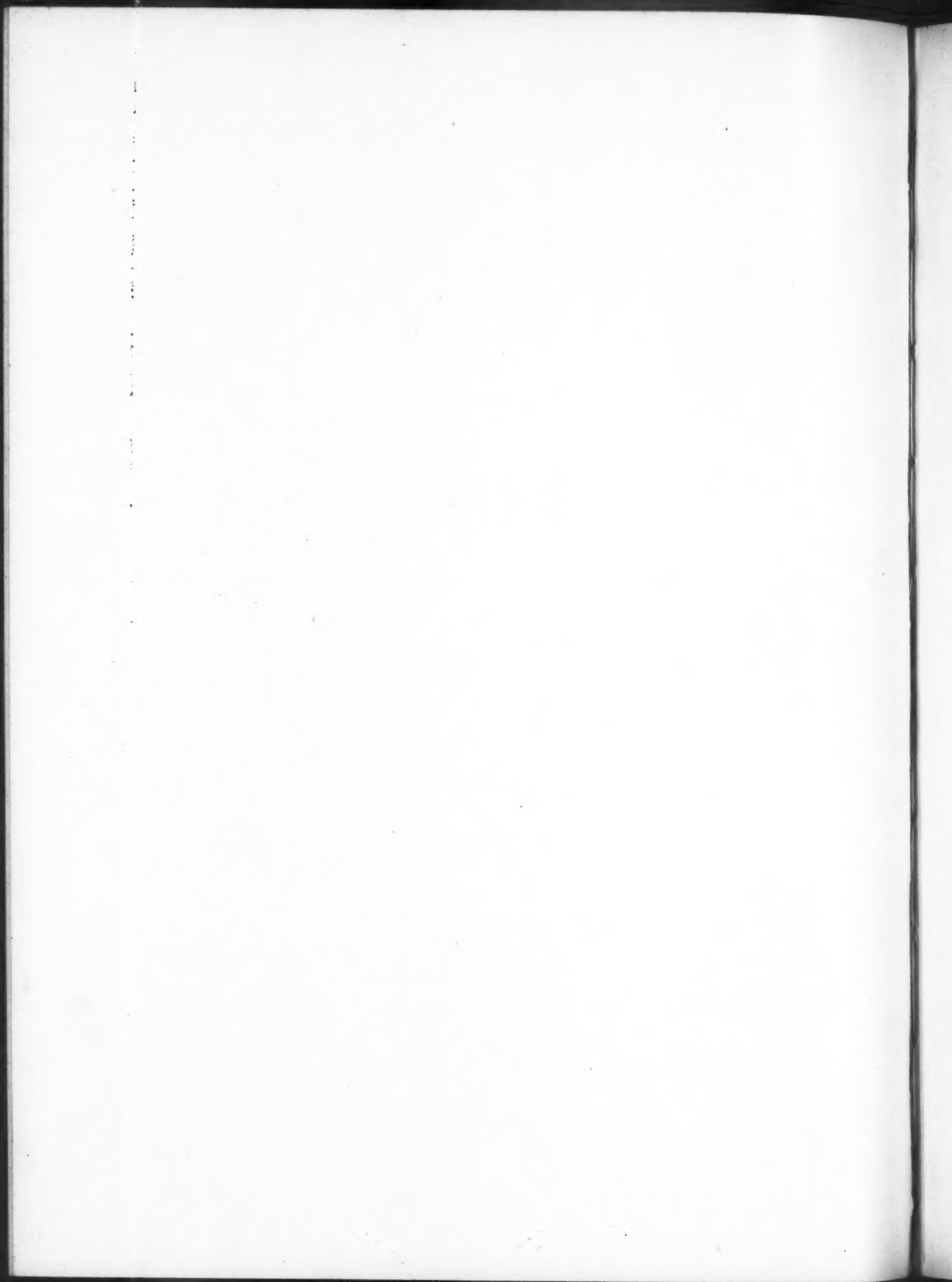
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Supplement to Pacific Pulp & Paper Industry

F. M. COUCH
President, Pacific States Paper Trades Association





PAPER IMPORTS—1928

Entering U. S. Pacific Coast Customs Districts

January 1 to October 31

Read "thousand" (i. e., add "000") after all figures denoting pounds.

	Newsprint		Printing Paper		Writing		Greaseproof		Wrapping		Tissues	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
To Los Angeles	60,852	1,938,312	547	26,797	12	5,967	140	4,468	253	11,410	4	2,408
From Canada	47,108	1,572,165										
From Sweden	10,427	279,218							253	11,322		
From Finland	174	5,362	466	20,722	1							
From Germany			3	1,418	1	631	23	2,118	*	18	*	66
From Norway	2,932	75,312										
From France					4	1,680						
From Other European	1	35	1	478	4	2,291	2	220			*	82
From Central America	63	1,674										
From Orient			2	1,078	1	254			*	70	4	2,260
From Mexico	147	4,546										
From All Others			75	3,101	2	1,102	115	2,130				
From Australia					*	9						
To San Francisco	87,505	2,820,734	502	43,508	108	37,697	8	786	10	1,716	7	2,988
From Canada	57,695	2,135,140	8	11					*	11		
From Sweden	29,306	667,404	400	18,620					5	231	*	62
From Finland	41	1,212										
From Germany			34	7,871	37	7,392	8	770	1	375	1	233
From Norway	463	16,978	43	1,706								
From France					16	7,322						
From Other European			15	10,422	35	16,162					2	1,035
From Central America			2	418	1	266					2	808
From Orient			5	3,753	10	2,973	*	16	3	841	1	447
From Australia					3	1,058						
From All Others			3	707	6	2,524			1	258	1	403
To Oregon	16,286	523,170	2	264	19	3,085	*	13	1	256	2	355
From Canada	8,285	266,561	*	102	*	48						
From Germany					14	1,892			1	243	*	73
From Orient					*	47	*	13	*	13	*	29
From France					*	4						
From Sweden												
From Other European			2	162	5	1,092					2	253
From All Others	7,988	256,176			*	2						
From Norway	13	432										
To Washington	134,913	4,113,403	21	892	13	5,501	33	2,991	208	3,723	5	1,418
From Canada	125,778	3,869,595	*	110	3	1,075						
From Sweden	9,135	243,808					16	1,039			2	335
From Germany			21	765	*	124			*	230	1	330
From France			*	17	2	1,272						
From Other European					3	1,229			112	1,833	*	219
From Orient					3	843			96	1,660	1	273
From Australia					2	889						
From All Others					*	69	17	1,952			1	261
Total Pacific Coast	299,556	9,395,619	1,070	71,461	152	52,250	181	8,258	472	17,105	18	7,169

*For convenience the last three "000's" have been omitted in figures denoting pounds, and the figure given is the nearest thousand. The asterisks denote small quantities of less than 500 pounds, and value only is given.

PULP IMPORTS—1928

Imports Entering U. S. Pacific Coast Customs Districts, by Country of Origin

(January 1 to October 31)

	Mechanically Ground		Bleached Sulphite		Unbleached Sulphite		Unbleached Sulphate	
	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons
To Los Angeles	65,997	2,148	3,652	51	166,964	3,293	195,996	4,480
From Canada	2,746	94	780	11	9,191	178	15,573	755
From Sweden	38,117	898			157,773	3,115	173,940	3,525
From Finland	15,029	750						
From Norway			2,872	40			6,483	100
From Other European	4,298	200						
From All Others	5,807	300						
To San Francisco	51,449	2,231			132,461	3,720	124,200	2,500
From Canada	33,251	1,452			20,884	780	93,994	1,874
From Sweden					100,133	2,210	30,206	626
From Finland	16,120	708						
From Norway					10,683	450		
From Other European					761	280		
From Orient	2,078	71						
To Washington	635	22	110,644	1,564	39,880	1,061	2,420	54
From Canada	635	22	110,644	1,564	39,880	1,061	2,420	54
To Oregon	5,211	248					22,322	637
From Canada							22,322	637
From Finland	3,034	150						
From Europe	2,177	98						
Total Pacific Coast	123,292	4,649	114,296	1,615	339,305	8,074	344,938	7,671

PAPER IMPORTS—1922-1928*

Entering U. S. Pacific Coast Customs Districts

	LOS ANGELES		SAN FRANCISCO		OREGON		WASHINGTON		TOTAL	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
NEWSPRINT										
1922	61,932,000	2,228,000	62,809,000	2,261,000	5,476,000	162,000	45,194,000	1,715,000	175,391,000	6,366,000
1923	104,420,000	3,993,000	110,284,000	4,196,000	4,850,000	163,000	61,459,000	2,433,000	281,013,000	10,785,000
1924	113,737,000	4,231,000	87,939,000	3,290,000	1,453,000	42,000	56,659,000	2,332,000	259,788,000	9,895,000
1925	96,415,000	3,425,000	81,632,000	2,813,000	545,000	16,000	78,242,000	3,103,000	256,834,000	9,357,000
1926	81,171,000	2,707,000	97,002,000	3,206,000	59,000	2,000	97,235,000	3,647,000	275,467,000	9,562,000
1927	84,565,000	2,794,000	117,064,000	3,761,000	21,592,000	695,000	120,074,000	4,378,000	343,295,000	11,628,000
1928*	60,853,000	1,938,000	87,505,000	2,820,000	16,286,000	523,000	134,913,000	4,113,000	299,557,000	9,394,000
PRINTING PAPER†										
1922	6,000	2,000	41,000	4,800	2,000	200	—	—	49,000	7,000
1923	2,000	400	157,000	21,400	42,000	2,000	58,500	2,100	259,000	25,900
1924	933,000	35,900	441,000	35,000	69,000	3,000	1,000	800	1,444,000	74,700
1925	397,000	19,000	553,000	44,000	30,000	2,000	37,600	2,500	1,017,600	67,500
1926	1,130,000	52,000	756,000	57,000	9,000	500	121,000	7,200	2,016,000	116,700
1927	1,004,000	48,000	548,000	45,000	5,000	300	15,000	1,000	1,572,000	94,300
1928*	546,000	27,000	502,000	44,000	2,000	300	21,000	900	1,071,000	72,200
WRITING PAPERS‡										
1922	7,000	1,000	27,000	7,000	40	30	400	160	34,440	8,190
1923	17,000	8,000	70,000	20,000	1,000	400	11,000	2,000	105,000	30,400
1924	37,000	13,000	128,000	32,000	19,000	2,000	10,000	3,000	194,000	50,000
1925	13,000	6,000	120,000	30,000	900	500	10,000	3,000	143,900	39,500
1926	25,000	12,000	198,000	40,000	1,000	1,000	14,000	5,000	238,000	58,000
1927	25,000	10,000	112,000	30,000	1,600	1,000	13,000	5,000	151,000	46,000
1928*	12,000	6,000	108,000	38,000	19,000	3,000	13,000	9,000	152,000	52,000
GREASEPROOF										
1922	—	—	12,000	1,000	—	—	—	—	12,000	1,000
1923	171,000	12,000	497,000	35,000	35,000	2,000	15,000	800	718,000	49,800
1924	89,000	5,000	42,000	2,000	13,000	2,000	36,000	2,000	180,000	11,000
1925	24,000	2,000	24,000	2,000	—	—	19,000	900	67,000	4,900
1926	63,000	4,000	51,000	6,000	—	—	12,000	600	126,000	10,600
1927	151,000	9,000	—	—	2,000	200	36,000	3,000	189,005	12,205
1928*	140,000	4,500	8,000	700	60	13	33,000	3,000	181,060	8,213
KRAFT WRAPPING‡										
1922	—	—	17,000	2,000	—	—	—	—	17,000	2,000
1923	—	—	—	—	—	—	—	—	—	—
1924	1,362,000	55,000	570,000	24,000	228,000	10,000	176,000	8,000	2,336,000	97,000
1925	263,000	10,000	326,000	14,000	—	—	33,000	2,000	622,000	26,000
1926	112,000	5,000	106,000	5,000	10,000	600	31,000	2,000	259,000	12,600
1927	109,000	5,000	113,000	5,000	12,000	500	—	—	234,000	10,500
WRAPPING‡										
1922	861,000	53,000	1,594,000	79,000	490,000	27,000	669,000	30,000	3,614,000	189,000
1923	2,930,000	142,000	2,416,000	109,000	608,000	30,000	1,266,000	67,000	7,220,000	348,000
1924	557,000	21,000	609,000	25,000	56,000	3,000	105,000	4,000	1,327,000	53,000
1925	219,000	10,000	12,000	2,000	7,000	200	60,000	3,000	298,000	15,200
1926	49,000	3,000	9,000	500	2,000	100	56,000	3,000	116,000	6,600
1927	149,000	8,000	28,000	1,500	200	20	11,000	500	188,200	10,200
1928*	253,000	11,500	10,000	2,000	700	200	208,000	4,000	471,700	17,700
TISSUES§										
1922	2,000	700	13,000	6,000	—	—	1,000	300	16,000	7,000
1923	9,000	1,000	21,000	9,000	5,000	2,000	4,000	1,000	39,000	13,000
1924	1,000	600	22,000	17,000	3,000	700	10,000	2,000	36,000	25,700
1925	4,000	2,000	42,000	12,000	300	100	4,000	700	50,300	14,800
1926	4,000	2,000	30,000	9,000	2,000	700	7,000	2,000	43,000	13,700
1927	7,000	3,000	10,000	5,000	3,000	1,000	6,000	1,500	26,000	10,500
1928*	4,000	2,000	7,000	3,000	3,000	400	5,000	1,500	19,000	6,900

*January 1 to October 31.

Figures in this table have been simplified by reduction to the nearest thousand, except in the case of small items of less than 1,000 pounds or less than \$1,000.

†1928 figures for "kraft wrapping" are included under "wrapping".

‡"Printing" also includes book (coated and not coated) and cover.

§"Writing" includes paperettes and other writing.

¶"Tissues" include crepe, towel, toilet, napkins and tissue.

INTERCOASTAL WATER BORNE SHIPMENTS OF PAPER—1927

EASTBOUND

(In cargo tons of 2,240 pounds)

Shipments To:	From—					
	San Diego	Los Angeles	San Francisco	Portland	Seattle	Tacoma
Portland, Me.	261	6,649	7,534	96	1,256	40
Boston, Mass.	101	6,467	4,343	1,150	118	—
New York, N. Y.	—	1,749	2,596	11,206	142	10
New Bedford, Mass.	—	200	20	—	—	—
Philadelphia, Pa.	—	182	160	1,932	21	—
Baltimore, Md.	—	26	828	42	51	2,343
Jacksonville, Fla.	—	—	—	621	—	—
Tampa, Fla.	—	—	91	—	—	—
New Orleans, La.	—	171	366	537	173	—
Houston, Texas	—	—	71	99	—	—
Total	53,419					

*Includes 32 tons from Everett, Wash.

†Includes 800 tons from Longview, Wash.

‡Includes 61 tons from Everett, Wash.

§Includes 468 tons from Longview, Wash.

¶Includes 407 tons from Vancouver, Wash.

INTERCOASTAL WATER BORNE SHIPMENTS OF PAPER—1927

WESTBOUND

Shipments From:	To—					
	San Diego	Los Angeles	San Francisco	Portland	Seattle	Tacoma
Boston, Mass.	—	3,800	8,843	1,537	855	48
New York, N. Y.	243	16,770	21,825	2,395	2,913	215
Philadelphia, Pa.	222	5,158	5,277	865	955	105
Wilmington, Del.	—	138	68	—	—	12
Baltimore, Md.	10	601	2,405	108	335	32
Norfolk, Va.	—	220	468	126	84	—
New Orleans, La.	—	703	858	116	83	35
Total	78,513					

*Includes 2 tons to Everett and 31 tons to Bellingham.

†Includes 29 tons to Bellingham and 23 tons to Everett.

‡Includes all commodities taking general classification of "paper".

Statistics from the U. S. Shipping Board Bureau of Research, Division of Statistics.

PULP IMPORTS—1922-1928

Entering U. S. Pacific Coast Customs Districts

	Los Angeles		San Francisco		Oregon		Washington		Total	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
MECHANICALLY GROUND										
1922	620	40,884	—	—	—	—	238	8,389	658	49,273
1923	731	33,200	727	13,157	—	—	111	5,988	1,569	52,345
1924	871	36,765	1,780	43,327	—	—	94	4,310	2,745	84,402
1925	200	6,635	1,374	40,164	—	—	—	—	1,574	46,799
1926	2,212	130,085	1,166	36,652	1,214	47,590	5,056	102,515	9,648	316,842
1927	3,442	183,323	1,582	42,476	—	—	—	—	5,024	225,799
1928*	2,148	65,997	2,231	51,449	248	5,211	22	635	4,649	123,292
UNBLEACHED SULPHITE										
1922	1,716	95,702	1,298	54,267	—	—	3,712	171,482	6,726	321,451
1923	2,600	168,107	3,664	216,785	—	—	10,250	529,643	26,514	914,535
1924	807	90,285	4,323	211,953	—	—	2,010	104,885	7,140	407,123
1925	1,805	103,040	2,031	87,384	180	11,219	991	59,090	5,007	260,733
1926	620	36,974	5,070	265,360	—	—	3,594	207,847	9,284	510,181
1927	4,209	244,622	8,361	421,013	—	—	1,463	63,428	14,033	729,163
1928*	3,293	166,964	3,720	132,461	—	—	1,061	39,880	8,074	339,305
BLEACHED SULPHITE										
1922	98	7,348	1,616	102,774	—	—	820	64,075	2,534	174,197
1923	100	9,125	1,533	120,423	—	—	1,461	117,660	3,094	247,208
1924	500	28,482	828	49,534	—	—	784	52,228	2,112	130,244
1925	995	55,094	2,053	116,678	1,500	98,913	1,270	88,380	5,818	359,065
1926	3,755	233,930	3,514	180,472	—	—	2,695	163,481	9,964	577,883
1927	1,299	89,438	260	9,345	—	—	2,775	189,468	4,344	288,251
1928*	51	3,652	—	—	—	—	1,564	110,644	1,615	114,296
UNBLEACHED SULPHATE										
1922	—	—	3,290	163,824	2,075	134,750	2,007	132,979	7,372	431,653
1923	598	40,751	2,714	161,714	5,413	398,743	210	9,772	8,935	610,980
1924	600	34,009	2,548	148,617	7,123	452,335	34	2,207	10,305	537,168
1925	3,719	217,312	2,965	147,366	9,075	554,796	—	—	15,759	919,474
1926	545	34,011	4,043	224,731	3,653	225,177	—	—	8,241	483,919
1927	2,530	134,600	3,282	210,618	100	4,963	—	—	5,912	350,181
1928*	4,480	195,996	2,500	124,200	637	22,322	54	2,420	3,671	344,938
BLEACHED SULPHATE										
1922	—	—	300	22,428	—	—	—	—	300	22,428
1923	—	—	—	—	—	—	—	—	—	—
1924	—	—	275	14,462	576	25,967	45	2,945	896	43,374
1925	336	18,201	28	824	—	—	—	—	364	19,025
1926	562	32,451	—	—	716	44,082	—	—	1,278	76,533
1927	1,084	70,934	—	—	—	—	—	—	1,084	70,934
1928*	—	—	—	—	—	—	—	—	—	—
OTHER WOOD PULP										
1922	—	—	—	—	—	—	—	—	—	—
1923	100	9,036	276	5,745	—	—	—	—	376	14,781
1924	—	—	—	—	—	—	—	—	—	—
1925	25	3,657	—	—	—	—	94	6,505	169	10,162
1926	204	5,203	—	—	—	—	—	—	204	5,203
1927	—	—	—	—	—	—	—	—	—	—
1928*	—	—	—	—	—	—	2	78	2	78

*Figures for 1928 are for the ten months—January 1 to October 31.

INTERCOASTAL WATER BORNE SHIPMENTS OF PAPER*—1926

EASTBOUND

(In cargo tons of 2,240 pounds)

Shipments To:	From—					
	San Diego	Los Angeles	San Francisco	Portland	Seattle	Tacoma
Boston, Mass.	246	6,601	2,757	772	58	—
New York, N.Y.	—	1,168	3,048	5,200	327	33
Philadelphia, Pa.	—	90	1,260	661	291	—
New Orleans, La.	—	155	420	215	31	27
Houston, Texas	—	—	77	209	4,396	551
Total	—	—	—	—	—	—
						28,594

WESTBOUND

Shipments From: To—

	San Diego	Los Angeles	San Francisco	Portland	Seattle	Tacoma	Total
Portland, Me.	—	5,042	4,331	42	850	—	10,265
Boston, Mass.	—	6,334	11,862	1,775	1,016	1	20,988
New York, N. Y.	394	12,406	19,628	2,668	2,478	175	37,791
Newark, N. J.	—	4,919	3,347	—	—	—	8,266
Philadelphia, Pa.	86	3,916	3,925	616	598	94	9,235
Baltimore, Md.	11	698	2,225	151	328	—	3,474
New Orleans, La.	—	1,369	1,497	411	346	47	3,670
Total	—	—	—	—	—	—	93,792½

Statistics from the U. S. Shipping Board, Bureau of Research, Division of Statistics.

*Includes all commodities taking general classification of "paper."

†Includes 103 tons to Everett and Bellingham.

Pacific Coast

Shows Significant Gain in

Pulpwood Consumption in 1927

FROM the standpoint of pulpwood consumed, the Pacific Coast states show important gains for 1927, according to figures released in December by the Department of Commerce. Washington showed the most significant gain, moving into fourth place among the states for pulpwood consumed, showing a gain of approximately 40 per cent over pulpwood consumption reported in 1926.

As several mills came into production in Oregon and Washington in 1927 and other older mills materially increased their capacities, the 1927 consumption figures for the Pacific Coast do not exactly reflect the present pulpwood consumption. These 1927 additional capacities, together with the new mills and increased capacities coming into production in 1928, will, without question, reveal a considerable revision upward for pulpwood consumed in the Pacific Coast states when the 1928 figures are available.

In the tabulations showing the kinds of pulpwood consumed some interesting trends are noted. There was a notable increase in the amount of slabs and other mill waste consumed, although the total percentage of mill waste used, in relation to the total pulpwood consumption, is only 4 per cent. Spruce, the preponderant favorite of all the pulpwoods, shows a decline of 4.5 per cent from its position of leadership, while hemlock shows an advance, indicating perhaps that Western Hemlock is somewhat coming into its own and receiving that recognition which is its due.

The data collected in 1928 in cooperation with the Department of Agriculture shows that the total consumption of pulpwood in 1927 amounted to 6,659,157 cords, reported by 219 mills. This figure represents a decrease of 1.6 per cent, as compared with the consumption in 1926, 6,766,007 cords, reported by 224 mills. The total production of wood pulp in 1927 was 4,313,403 tons, a decrease of 1.9 per cent, as compared with 4,394,766 tons for the previous year.

The leading three states in this industry are Maine, Wisconsin and New York. Decreases are shown for most of the states reporting, important exceptions being Louisiana and the three Pacific Coast states—California, Oregon and Washington.

Detailed statistics are presented in the following tables. The figures for 1927 are preliminary and subject to such correction as may be found necessary after further examination of the returns.

According to data collected at the biennial census of manufacturers taken in 1928, 709 establishments engaged primarily in the manufacture of paper and paper board in 1927 reported products valued at \$919,891,465, and 219 establishments engaged primarily in the manufacture of wood pulp reported products valued at \$218,198,201. These two lines of manufacture, which at pre-

ceding censuses were treated as a single industry, were treated as separate industries at the census for 1927. Because of this change in practice, the statistics for prior censuses are not strictly comparable with those for 1927.

The total production of paper and paper board in 1927 amounted to 10,002,070 tons (of 2,000 pounds), valued at \$872,206,847. This total was made up as fol-

Pulpwood Consumed and Wood Pulp Produced by States: 1927 and 1926

[This table gives statistics for all states for which separate figures can be shown without disclosing operations of individual establishments. Certain of the "All other states," however, reported larger amounts of pulpwood consumed and of wood pulp produced than some of the states shown separately.]

State—	Pulpwood consumed (cords)		Wood pulp produced (tons of 2,000 pounds)	
	1927	1926	1927	1926
United States	6,659,157	6,766,007	4,313,403	4,394,766
Maine	1,273,268	1,298,357	942,162	945,790
Wisconsin	1,199,615	1,224,443	690,921	712,565
New York	882,388	990,701	710,227	822,131
Washington	445,664	305,787	268,349	199,164
Pennsylvania	398,021	425,684	216,587	233,258
New Hampshire	358,376	431,138	200,324	248,600
Michigan	351,688	331,570	193,539	200,604
Louisiana	321,272	258,439	179,878	137,571
Virginia	316,032	317,058	170,630	163,506
Minnesota	281,156	288,390	191,220	190,454
Oregon and California	267,235	232,989	200,869	178,841
Massachusetts	49,473	54,510	31,822	34,903
Vermont	31,795	48,554	32,562	46,376
All other states*	483,174	558,387	284,313	281,003

*1927—Delaware, District of Columbia, Maryland, Mississippi, North Carolina, Ohio, South Carolina, Tennessee, Texas and West Virginia; 1926—same states, together with Georgia.

Table 2—Pulpwood Consumed, by Kinds of Wood: 1927 and 1926

Kind—	Quantity (cords)		% distribution	
	1927	1926	1927	1926
Total	6,659,157	6,766,007	100.0	100.0
Spruce:				
Domestic	2,074,511	2,415,870	31.2	35.7
Imported	944,308	1,013,155	14.2	15.0
Hemlock:				
Domestic	1,146,603	1,064,661	17.2	15.7
Imported	5,048	10,702	0.1	0.2
Yellow pine, Southern	712,610	684,816	10.7	10.1
Poplar:				
Domestic	214,933	212,178	3.2	3.1
Imported	186,695	210,133	2.8	3.1
Balsam fir:				
Domestic	327,663	254,614	4.9	3.8
Imported	84,087	42,500	1.3	0.6
Jack pine	171,131	137,494	2.6	2.0
Yellow poplar	131,113	134,747	2.0	2.0
Beach, birch and maple	78,311	*	1.2	*
White fir	74,628	76,421	1.1	1.1
Gum	64,314	49,801	1.0	0.7
Tamarack or larch	61,114	94,695	0.9	1.4
All other kinds?	115,480	183,553	1.7	2.7
Slabs and other mill waste	266,608	180,667	4.0	2.7

*Included in "All other kinds."

†—1927—Basswood, cedar, chestnut, cottonwood, Douglas fir, Western yellow pine and willow; 1926—Basswood, beech, birch, buckeye, cedar, chestnut, cottonwood, Douglas fir, maple, Western yellow pine, white pine and willow.

Process—	Quantity (tons of 2,000 pounds)		Per cent of increase or decrease (—)
	1927	1926	
Total	4,313,403	4,394,766	— 1.9
Ground	1,610,409	1,764,248	— 8.7
Soda fiber	487,478	496,920	— 1.9
Sulphite fiber	1,538,118	1,558,175	— 1.3
Sulphate fiber	617,834	519,960	18.8
Semi-chemical	11,983	*	—
Screenings:			
Mechanical	8,229	9,944	—17.2
Chemical	39,352	45,519	—13.5

*Not reported.

lows: Standard newsprint, in rolls and sheets, 1,519,737 tons, valued at \$99,068,924; hanging paper, 109,850 tons, \$8,748,152; poster, novel, news-tablet, lining, catalogue, etc., 183,338 tons, \$15,573,062; book paper, 1,328,782 tons, \$160,868,747; cover paper, 26,333 tons, \$5,937,919; writing paper (fine), 508,808 tons, \$105,148,140; wrapping paper, 1,525,305 tons, \$162,579,549; paper boards (container boards, folding boxboards, building boards, etc.), 3,773,608 tons, \$211,263,855; tissue paper, 316,070 tons, \$46,616,919; absorbent paper,

63,766 tons, \$13,331,497; building paper, 625,589 tons, \$40,062,024; other paper, 20,884 tons, \$3,008,059.

The total output of wood pulp in 1927 was 4,313,403 tons, valued at \$207,332,666, the principal items comprised in this total being as follows: Ground wood—steamed, 181,031 tons, valued at \$6,857,710; not steamed, 1,429,378 tons, \$39,101,493. Soda fiber, 487,478 tons, \$32,842,265. Sulphite fiber—bleached, 680,288 tons, \$53,847,246; unbleached, 881,709 tons, \$45,337,305. Sulphate fiber, 593,955 tons, \$28,133,175.

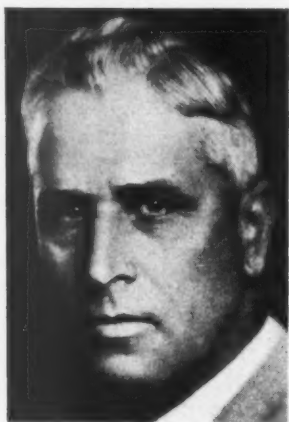
The News Print Industry

A Review by Years 1921-1928

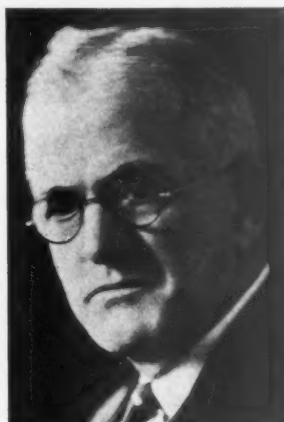
The total North American output of news print paper in 1928 according to News Print Service Bureau statistics was 4,043,780 tons, of which 2,381,102 tons was made in Canada, 1,414,952 tons in the United States, 230,745 tons in Newfoundland and 16,981 tons in Mex-

ico. The Canadian output was 14 per cent more than in 1927, that in the United States 4.8 per cent less, with a gain of 13.7 per cent in Newfoundland and 20 per cent in Mexico, making a total increase of 254,347 tons, or 6.7 per cent.

	PRODUCTION				SHIPMENTS		
	Average Tons Per Day	Actual Tons Per Month	Actual Tons Per Operating Day	Per Cent Actual To Average (Totals Per Month)	Tons Per Month	Per Cent of Average Production	MILL STOCKS
CANADIAN MILLS							
1928—Twelve Months	9,397	2,381,102	8,485	82.0	2,399,030	82.6	19,139
1927—" "	7,934	2,086,949	7,236	85.1	2,062,749	84.2	38,117
1926—" "		1,881,737			1,878,746		14,345
1925—" "		1,522,217			1,525,150		18,414
1924—" "		1,352,994			1,344,757		21,954
1923—" "		1,266,232			1,257,521		15,123
1922—" "		1,081,916			1,087,572		7,573
1921—" "		808,066			803,162		13,896
UNITED STATES MILLS							
1928—Twelve Months	5,580	1,414,952	4,779	81.8	1,397,393	80.8	34,469
1927—" "	5,768	1,485,495	4,931	83.1	1,474,521	82.5	20,877
1926—" "		1,684,218			1,684,790		12,030
1925—" "		1,530,318			1,534,345		16,238
1924—" "		1,481,425			1,480,819		23,757
1923—" "		1,485,000			1,477,332		23,669
1922—" "		1,447,688			1,452,414		19,208
1921—" "		1,225,235			1,226,064		23,934
UNITED STATES AND CANADIAN MILLS							
1928—Twelve Months	14,977	3,796,054	13,264	81.9	3,796,423	81.9	53,608
1927—" "	13,702	3,572,444	12,167	84.3	3,537,270	83.4	58,994
1926—" "		3,565,955			3,563,536		26,375
1925—" "		3,052,335			3,059,495		34,652
1924—" "		2,834,419			2,825,576		45,711
1923—" "		2,751,232			2,734,853		38,792
1922—" "		2,529,604			2,539,986		26,781
1921—" "		2,033,301			2,029,226		37,830
NORTH AMERICAN PRODUCTION							
	Canada	United States	Newfoundland	Mexico	Total		
1928—Twelve Months	2,381,102	1,414,952	230,745	16,981	4,043,780		
1927—" "	2,086,949	1,485,495	202,852	14,137	3,789,433		
1926—" "	1,881,737	1,684,218	186,471	13,412	3,765,838		
1925—" "	1,522,217	1,530,318	96,588	12,681	3,161,804		
1924—" "	1,352,994	1,481,425	64,648	11,500	2,910,567		
1923—" "	1,266,232	1,485,000	63,906	12,000	2,827,138		



FRANK C. STRATFORD

FRANK E. JEFFRIES
Henri Jacobs Studio, TacomaTHOMAS A. O'KEEFE
Boye Portrait, San Francisco

The Paper Trade

COMPETITION is keen. And getting keener. This thought seems to be reflected quite unanimously by Pacific Coast paper jobbers. Changing conditions, new tonnage, new demands, all have had their effect in keeping the Coast jobber right on his toes if he would stay in the business. The subjects discussed by the Pacific States Paper Trade Association at the Del Monte convention in May, 1928, reflected the increasing attention that is being paid to possible economies in deliveries, credit memorandums, and special services. The tendency has been to reach out to the consumer and get there with a little edge on the next fellow.

The year marked the retirement from the association presidency of M. R. Higgins of the Zellerbach Paper Co., who had served continuously since 1923, not to mention a term of one year on a previous occasion from 1918 to 1919. The association adopted a resolution at the Del Monte meeting in respect to Mr. Higgins' services and added a hope that "his example as president be a guide for the future presidents who are to serve our association."

Some disturbance in prices was experienced during the year, particularly in kraft papers in which line the rapid expansion in the South has developed a new element. Material increase of paper bag production on the Coast during the year also injected some complications. The direct-sale question continued to menace the jobber, but no great changes were experienced in this line. Some new and important sales alliances developed in the course of the year.

One of the interesting developments of the year

was the acquisition of the Mutual Paper Corp., independent Seattle jobbing house, by Blake, Moffitt & Towne, thus adding a very important link in the Coast-wide chain. Some other houses changed hands, the general tendency being toward merger with the larger organizations. Some new branches were added during the year by the larger companies, and some new independent houses were established. Several new jobbing

warehouses were built in the course of the year, and it is significant to note that careful attention to detail was observed in the construction of most of these new buildings, all facilities looking toward quicker and better service.

A number of new paper products came on the market during the year and paper continued to be turned to new uses. In fact there seems to be quite a tendency to get into diversified lines. Any number of jobbers have added side lines that bear but small, if any, relation to paper products. It seems that this diversification is more noticeable

with those jobbers running more to coarse papers and less with those whose stocks are more confined to the finer printing papers. How far to go in diversification is a frequently discussed problem and there are both pro and con arguments. Narrower margins in some of the more "standard" lines of paper have had their effect in forcing the jobbers to add side lines to keep up the margin or profit, but some wonder if the ultimate will not as great a departure from the old-time paper jobbing house as the modern drug store is from the pharmacy of yesterday.

Time alone can tell the future.

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SECRETARY-TREASURER

Charles Kahn, San Francisco.

1929 MEETING, DEL MONTE, WEEK OF MAY 6



CHARLES PRITCHARD
Boye Portrait, San Francisco



G. O. ROGERS



CHARLES KAHN

Paper Trade In Washington

GREETED by a smooth sea, the good ship "Paper Trade of the Northwest" left port on the first of January, 1928, and an uneventful voyage for the first half of the year was recorded in the log book. During the summer months the engines slowed up somewhat, but with a good head of steam the craft added a few knots of speed during the fall months. With the opening of 1929, however, the barometer indicates bad weather in the offing and the formerly glassy sea has become decidedly choppy, with white caps on the waves.

Consequently paper dealers in the Northwest, particularly in the coarse grades, are keeping a weather eye on the barometer and are making things fast for a storm. The principal difficulty seems to be a gap between production and sales and in eastern mills entering the territory with direct sales, taking any size lots and seemingly intent on opening new markets rather than on making an immediate profit. Southern kraft mills have also invaded the territory to a small extent. All of which is business, but also an indication that Northwest dealers must exercise considerable activity to hold their own market.

With such a pessimistic beginning it is perhaps fitting to review a few of the brighter aspects of the year. On a whole the paper trade in the Northwest was better during 1928 than during the previous 12 months. Most of the dealers report a satisfactory year with no sensational rises or falls. Volume of sales increased but there has been a corresponding increase in costs, dealers declare.

General business in the Northwest has a healthy air. New industries entered during 1928, and 1929 holds forth promise of still greater enterprise. The paper trade cannot help but feel the effects of such changes in business conditions. None of the heretofore much heralded "presidential year depression" was felt, and the outcome of the election presages increased prosperity for Northwest dealers.

Another fact that helped the paper trade during 1928 and brightens the skyline for the future is the co-operation between advertisers and printers in the use of Northwest lines. Printers have shown during 1928 an encouraging degree of interest in distinctive paper for their printed matter. Enterprising advertisers and

printers are coming to realize the importance of the grade of paper on which their advertising matter is printed and are demanding ideas from paper dealers, and that gives the progressive dealer new opportunities for making sales.

Cooperation between Seattle and Tacoma dealers continued during the year with beneficial results on all sides. Some of the smaller dealers, however, have been slow to avail themselves of the opportunities and advantages which cooperation affords—with, in some cases, adverse results to their own interests.

Before Northwest business can run on an even keel further steps must be taken in the standardization of lines. A few advances were made during 1928. At present competitive bidding is hampered by the fact that lack of standardization permits some dealers to close a deal with a small bid on an inferior line—the consumer not realizing the difference in the qualities of the paper which he is being offered.

Paper Trade In British Columbia

By FRANCIS WRIGHT

Secretary-Treasurer, Smith, Davidson & Wright, Vancouver, B. C.

IN British Columbia the paper trade is going through a period of keen competition, but in spite of various economic handicaps it is making steady and effective progress.

With prices down and expenses of operation higher the handling of paper has not been as profitable as we would like to see it, and it would be a mistake to characterize the year just past as prosperous. However, we have maintained volume and we believe that holds good for most of the firms doing business in paper in British Columbia. Some concerns, in fact, have provided for increases and the present year will probably record larger sales than ever.

Paper sales are a true barometer of general business activity and as the city of Vancouver and other British Columbia centers grow in population and commerce the demand for paper will advance.

British Columbia is making rapid industrial gains and these have had a direct effect on paper consumption. As new uses for paper developed the trade was

(Turn to page 73)

Some Problems

ARE EVER PRESENT

In the Paper Trade

In this discussion some of the salient questions are summed up

By W. D. McWATERS

Manager, Zellerbach Paper Co., Portland Division

THE past year of merchandising has given us additional experience as to how problems forecast a year ago would be solved. Many of the conditions just then starting were found, at the end of the year, still unsettled, and a further problem for 1929.



W. D. McWATERS

Chain stores, consolidations, and mergers are continuing and in some instances growing larger. The matter oft here being a direct mill connection—or indirect through the jobber—is another problem for 1929. These conditions, with an overproduction by mills, are making jobbing conditions difficult and it is hard to make a legitimate profit on merchandise handled. This means that expenses must be watched on every end if any profit is to be realized at the close of 1929, providing, of course, that

conditions are the same and the problems still unsettled.

With the numerous new mills on the Coast, there is an overproduction on practically all grades of paper and as all mills desire to run full time, the anxiety to obtain orders brings the possibility of a troublesome market. No jobber, therefore, should be party to or help to keep the mills idle by sending any business East when the merchandise can be purchased from any of the Coast mills. The buying and shipping in of any merchandise which can be manufactured on the Coast is a destructive policy and means a tearing down, price competition, and in the final analysis will affect jobbers, competitors and mills already here and established. All who are jobbers or consumers help themselves by helping the Coast mills, thereby keeping labor in the woods, in the local mills, and the several employees' purchasing power with the retail merchants. With the Coast mills busy and prosperous, all jobbers and merchants would be in a position to reap some of the prosperity.

Mills can help the jobbers by adopting a smaller mill

package as demonstrated in the carton pack, which enables the jobber to sell original mill packages to a greater number of clients, as the distributing package is smaller, and the jobber's overhead naturally decreases as the opportunity to distribute original mill packages increases. Some of the Coast mills, in adopting an upcharge for carton pack, penalize the jobbers in communities where jobbers have adopted a resale price on the basis of a mill package in a smaller unit—as designated by the carton pack—and mills therefore do not show the hoped for cooperation and consideration for the jobber's profit, although I believe and feel most jobbers are trying to give consideration for the mill's problem. More especially is this true where the jobbers are substituting a Coast product for an item which was formerly purchased in the East.

Let us establish a standard of fair play as between mills, jobbers, and business associates, all trying to help solve each other's problems, and then live up to this standard, that 1929 may show us all a margin of profit.

The items of remuneration and expenses of salesmen are always with the jobber and a year ago the adjustment of salesmen's salaries by the net profit control system was further considered by many Coast houses. In the East this method has, in some instances, seemed to be satisfactory, but from information I have been able to collect from houses who directly use this method on the Coast—the net profit control system is not entirely satisfactory as the only method of figuring remuneration to the salesmen. The net profit control system has had a tendency to teach salesmen the vital necessity of obtaining orders not under ten dollars, but as with many other systems, there are objections to accepting it in its entirety. It would seem, therefore, that it was best to consider the net profit control, merely as a yardstick by which additional information can be had when considering the remuneration of the individual salesman.

Automobile expense is a serious problem and must be given careful study and consideration by the jobber's salesmen, mill salesmen and their respective houses. Conditions are not as pressing for salesmen owning automobiles today, as busses, trains and rapid connections between towns do not allow the lost time as in former years, due to salesmen waiting for transportation.

Paper Trade in British Columbia

(Continued from page 71)

endeavoring to make the most of them, although in the matter of opening up new markets the past year has seen little progress.

The fruit industry is opening up an important channel for paper sales. In the past the Okanagan fruit crop has been marketed haphazardly and the result has been poor prices with very little money in the treasury of the sales agencies for the improvement of packing methods. The industry is now organized on a better basis, the provincial government having stepped in and sponsored the formation of a marketing board. This has brought stability to the orchard industry and an improvement in sales methods, one result being the standardization of pack and the greater use of paper wraps.

British Columbia paper firms are gradually extending the border of their marketing field and several of them now maintain agencies in the prairie provinces. Three successive years of good wheat crops have made the prairies a rich market for many commodities, and paper has shared the benefit of this situation.

Competition from United States firms is still being felt in British Columbia and in certain lines it has been found impossible to meet the prices quoted by Washington organizations. British Columbia is now more self contained in the matter of paper supply than ever, and paper dealers expect that within a few years very little paper will be imported from outside the province.

Paper Trade In Northern California

By CHARLES PRITCHARD
Sales Manager, Bonestell & Co., San Francisco

AS we look back in retrospect on the business year just past, our pride in small successes cannot but be mixed with disappointment resulting from a very noticeable increase in sales resistance and little or no increase in sales volume.

While endeavoring to find an explanation for this condition, particularly in the fine paper field, one must give due consideration to the unprecedented wave of stock market speculation which has held the attention of the business world throughout the entire year. When a business man sees people around him making more money and getting more prompt and generous returns on stock speculation than he can extract from his own particular field of endeavor, the natural result is to withdraw capital and brains from his own business and center his attention on the stock market. Undoubtedly this condition has been responsible for the greatly increased effort necessary to hold up the level.

The "election year" bugaboo added a small part and unfavorable marketing conditions for many of California's leading products helped to create an unfavorable condition for the paper merchant.

In the coarse paper field the inevitable result of over production by Coast mills is keenly felt by every distributor.

The growing tendency of mills to go direct to the consumer wherever large tonnage is available without credit risk is another ever increasing menace.

The consolidation of large jobbing and manufacturing interests under one control has resulted in new alignments and some sudden changes in policy and sources of supply.

For the future the prospect is much brighter. A settled political outlook, a safe and sane stock market under a sane control from undue speculation, an in-

crease in advertising and general sales effort, an honest endeavor to avoid our mistakes of the past—all these point to a prompt return to normalcy—and prosperity in 1929.

Trade In the Rocky Mountain Region

By J. HARRY CUSTANCE
Treasurer and General Manager
Carter, Rice & Carpenter Paper Company

BUSINESS for the past year was well up and above that for 1927 as regards volume in spite of more active competition and in the face of the loss of considerable business going out of the territory through the collective buying of the large chain store groups. The latter made great inroads into the territory during the year and as most of the chains are financed by outside capital a large percentage of their buying is done elsewhere. This buying was felt mostly in the coarse paper sales with a consequent smaller profit in this line. Sales of general lines were a fraction better than in 1927.

A rather backward agricultural year slowed up sales appreciably. Crops in the Rocky Mountain region were good but commanded lower prices and the result affected to some extent all lines of industry.

The presidential year had little effect on sales, those lost through an apprehensive attitude on the part of some buyers being made up through increased sales for political advertising purposes. Farmers were able to take care of their obligations at the banks, but had little left to make other than necessary purchases. This loss of patronage of course left its stamp on all industry and appreciably affected paper sales.

Sales of related lines were fair and above those of 1928. Cordage did well. Firms handling linoleum and felt base flooring had little to complain of in these lines. Paper specialties enjoyed a good year, particularly the innovations. In spite of a very mediocre tourist season those articles designed for the use of picnickers moved rapidly. A greater demand for paper towels and napkins was also noted.

Collections were slower than in the years immediately preceding, due primarily to the conditions noted above.

The year 1929 gives promise of greatly improved business conditions. With the election out of the way and the country settled down to normal activities industry has every reason to look forward to a banner year. The whole social structure appears to be on a much sounder basis. Farmers have already entered into contracts for their 1929 crops which bid fair to yield them a far greater return than in the year just closed. The beet growers have contracted with the large sugar companies without the long and expensive litigation attending the contract prices in 1928. Other growers are equally well along in their contracting, leaving them a fair working basis on which to proceed with their spring planting. The effect of these moves is already being noticed in buying.



J. HARRY CUSTANCE



R. E. BARKER



CHARLES RUBLE



DAVE SAHLEIN

The Paperboard Industries

As Viewed in Retrospect and With
a Look Toward the Future

By M. V. BROOKS
Pacific Straw Paper & Board Co.

ANY REVIEW of the board and paper box manufacturing industry of the Pacific Coast must take first into consideration the fact that conditions are changing on the Coast with remarkable rapidity. This change does not confine itself to the pulp, paper and board industry alone, although in that division of industrial life the Coast has witnessed remarkable growth in the past few years. The fact is that the entire Coast is growing, and, with growth, outliving the conditions that were good enough for yesterday. Population on the Pacific Coast is growing at a rate four times as fast as in the United States as a whole. That in itself is a factor of tremendous importance. Our learned economists are quite unanimous in predicting that the Coast will swell its population many times within the next few decades.

With population growth comes other things. Our foreign trade is increasing and we are at the dawn of

an era of tremendous commerce with those nations across the Pacific which are waking to a new order of industrial civilization. We are not so far removed from the rest of the country as we once were. The Panama Canal has brought us nearer to the Atlantic Coast. Faster trains have shortened the distance overland. We are by no means the rustic community that was pictured in the school geographies of yesterday, and it might be said in passing that those who are not acquainted with the Coast of today and who still retain their eighth grade geography impressions really have no idea just how far those school books have been left behind.

Pass now from the generalities to the specific subject. The board industry on the Pacific Coast has experienced a most rapid growth in recent years. It is estimated that the capacity of the Coast mills, for all kinds of board, is now about 250,000 tons annually. Much of this growth is credited to the growing use of kraft liner in the manufacture of corrugated and solid fibre boxes. Much of the kraft liner is going to Eastern markets, but the demand for this product on the Coast is growing at a rapid pace.

Coast Forges Ahead

Reports of the industry show that the production of boxboard in the United States as a whole in the past year increased about 5½%. The Coast increased about 15%. This serves to put some measure on the manner in which the Coast is moving ahead—and it also sheds some light on the additional problems set up before the Coast board and box makers in view of this speedily changing condition.

During the year 1928 the board manufacturers of the Pacific Coast operated under fairly normal conditions with the usual seasonal fluctuations in tonnage volume. Consumption was maintained in good volume, but there was a substantial increase in the spread between production available and demand. Overproduc-

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1929 MEETING, DEL MONTE, CALIF.

tion is, of course, the distinct menace to profitable operation of the board industry. In this respect the Pacific Coast shares its troubles with the Eastern board mills.

Competitive conditions demand higher plant efficiency to insure a reduction in the cost of manufacture. These further efficiencies have been secured by the installation of labor-saving devices, by increasing speed and drying capacity of machines. Continuous operation of a mill is, of course, essential in securing minimum costs, but in the search for this minimum the temptation is great to expend all available commitments of tonnage in the face of known seasonal fluctuations. This reacts to cause a reduction of operating time to the detriment of all concerned.

There is little doubt that the Coast has become largely self-sufficient in producing its own board. In former years large quantities of board were shipped to the Coast from the Eastern mills and also from foreign countries, but these importations have declined steadily and are believed to be now at about the minimum. Demand for better and better service, and other factors have sharpened competition and made it more difficult for the non-Coast mills to meet the Coast market. In fact, the trend is even now somewhat in the other direction, and the future is likely to see board moving from West to East instead.

Satisfactory Year

Pacific Coast manufacturers of paper boxes experienced a very satisfactory year in general in 1928. This statement applies both with respect to profits and increase in volume of business. The trend of the times to accept the benefits of merger has evidenced itself in the paper box industry of the Coast. This tendency is evidence of the progressive nature of the box makers, of the ability to foresee conditions and prepare to meet them. Some mergers in the paper box industry were completed during the year. Others have been contemplated. The box makers are grasping the merger idea with its attendant benefits in decreased overhead, concentrated production and co-ordination of sales and purchases. These mergers are elevating the paper box manufacturing business to a greater position of prominence in the financial and business world.

But the paper box makers of the Coast have not evidenced their progressive nature merely in mergers. It is the rule rather than the exception for Pacific Coast factories to be extremely well equipped in personnel and machinery to design and produce anything a customer may desire. This holds true, both in the set-up and the folding box fields.

New Buying Era

Today is an era of hand-to-mouth buying. The practice extends all up and down the line. Keener competition, faster production, speedier deliveries, all have tended to shorten the time elapsing between the finishing of the product and the purchasing of it by the ultimate consumer. Retail sales move with the same celerity. All these conditions have brought about an era of convenient unit buying and that in turn has meant an era of packaged goods. The wholesaler, retailer and ultimate consumer want packaged goods, packaged goods that mean quick service and standard quality. And with the passing of bulk purchasing and the demand for smaller units has come the opportunity of the paper box maker. Packers of fruit, vegetables, fish, meat and numerous other products are constantly adding to the number of their products packaged in cartons and paper boxes.

It must not be inferred from these statements that the paper box maker has merely sat on the doorstep and waited for this package business to come to him. On the contrary, his has been the initiative that put many of these commodities into paper boxes in the first place. The paper box industry has been alert in the creation of new types of boxes, new designs to aid in the sale of goods.

As an example of this aggressiveness might be mentioned a new type of patented corrugated paper box



M. V. BROOKS
Boye Portrait, San Francisco

which holds 30 dozen eggs. This new type container is being watched closely and its success will mean the supplanting eventually on the Pacific Coast some 6,000,000 wooden egg crates, which are exceedingly bulky at their best. Here alone is a potential market for several thousand tons of board annually.

One more bright spot in the future of the Pacific Coast should be mentioned before terminating this discussion. I refer to the export market. Exports of paper board to the Orient, Australia and South America have shown a substantial gain in recent years and the outlook for 1929 is very encouraging. Products made or grown in these countries for consumption in the United States are of necessity following the trend here toward packaged goods, as these exporters are finding that the article in an attractive carton meets with more ready sale.

Paper Box Conditions in the San Francisco Bay District

By R. J. GRUENBERG
President, Boxboard Products Co., San Francisco

IF one talked in military terms, it might be said that the paper box industry in the San Francisco bay section in 1928 girded its loins and consolidated its positions and at the opening of 1929 moved ahead as a more compact unit toward business objectives which appear nearer than ever before.

The merger idea, with its advantages of reduced operating costs and elimination of duplication, was dis-

cussed in the industry during the year and in December came the announcement of two new companies to take the place of eight older companies. One of these consolidations is the United Paper Box Co., and the other is the Consolidated Paper Box Co. It is within the realm of possibility that more mergers may be effected in this industry in 1929.

Formation of the Consolidated Paper Box Co. removed from the paper box industry in San Francisco two of the oldest companies in this field on the Coast. These were the Enterprise Paper Box Co., founded in 1893, and Thiebaut Bros., which traced its origin back to 1867. Most of the personnel of these companies joined the Consolidated forces and are remaining in the industry.

The early days of 1929 found these two new companies on their way, with everybody in the field benefitting by elimination of a certain amount of competition.

One feature of the 1928 activities in the paper box industry in the northern California district was the increase in competition from Eastern manufacturers, particularly in the corrugated and solid fibre branches. This competition, however, puts us up against stiff standards and makes for an improvement in the quality of our product.

There was a trend toward lower prices, too, in 1928, but this, however, was in line with practically all other commodities.

Our trade associations, both local and coastwide, were strengthened during the year, the members finding more and more that they have a great deal in common. Our convention at Del Monte, our annual banquet, our golf tournaments, our meetings with the Southern California folks—all these are in a successful move toward solidifying the industry and a mutual solution of common problems.

Portland Box Industry Optimistic

By GEORGE G. GUILD
President, Columbia Paper Box Co., Portland

Paper box production in Portland during 1928 was about on a par with that of 1927. Had conditions been more settled, box makers would perhaps have a different story. However, there is no denying the fact that those in the industry were affected by the general slowing up which made itself felt in virtually all industries. The latter statement is based on the fact that I regard our industry as a good business barometer. Such a wide variety of commodities is packaged nowadays that we who are engaged in paper box production have a good insight into general business conditions.

The past year has seen the development of a closer trade unit among local box makers. Our Friday noon meetings and social gatherings from time to time are making for a friendly spirit among business associates, and I have no hesitancy in saying that all of us are working more harmoniously than ever before.

It sounds trite to say that an increase in business during 1929 must come largely through creation of new demands. Yet it is as certain as anything can be that each of us can profit through study and research. Virtually all conveniences we enjoy are the result of the study of men who had vision to create what are now necessities. Our industry is no exception. We must make our products so necessary that merchants cannot afford to use antiquated merchandising methods.

Instead of telling our prospect, when showing him a new product, that we are offering him a "silent salesman," we should say that the new box is an "active salesman." It isn't so many years ago since the trade was without the sales aids we have given them. I recall when I used to have to kick the cat off the open gunny sacks of groceries when waiting on customers; nor does it seem long since I made tea swirls from letter-size paper. I mention these things to show how rapidly the grocer has come to the front. He is only one of our prospects. Although we have come a long way, we have a bright future ahead.

This year should see marked progress. January and February show an increase over the same period last year. Things are becoming stabilized, and our local box makers are in a position to take care of increased demands. Considerable new business is expected from Hawaii as a result of the trade excursion recently made by Portland business men.

The Paper Container Field Is Widening

Some Thoughts Expressed
By R. E. BARKER, President
Pacific Coast Paper Box Manufacturers' Association

DEVELOPMENT of new uses for paper boxes is one of the chief factors in the industry's progress in the Northwest during the past year. The trade is being called upon not only to supply the needs of consumers which for years have been buying paper cartons and containers, but to manufacture these articles for industries which until now have not used paper in their packing processes at all.

The sanitary feature and the factor of convenience are proving mighty selling arguments for the paper box trade and each year sees some new manufacturing concern swinging to paper boxes as a means of putting up their product in attractive, clean and readily saleable

LOUIS DEJONGE & CO.

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FANCY — EMBOSSED — GLAZED PAPERS

FRANK C. LEPPEN, WEST COAST TRAVELING REPRESENTATIVE
FROM 600 W. VAN BUREN ST., CHICAGO, ILL.

fashion. The expansion of the markets for trade marked goods means that the product must be wrapped and handled in a container of some kind so that the name and slogan may be attached, and this has provided a sales opportunity for the paper box manufacturer that has not been neglected.

In British Columbia we are still urging manufacturers to use paper cartons for packing less-than-box lots and the value of this is gradually taking hold. The fruit, dairy and fish industries which are important users of paper boxes in this province had a good year in 1928 and the prospects are for a better one in 1929. Their prosperity means more business for the paper box trade.

Business in the Rocky Mountain Region

By IRVING A. DELINE
President, Deline Manufacturing Co., Denver, Colorado

THE past year can safely be called the best in the history of box making in the Rocky Mountain region. Denver firms all report most gratifying business for the year. This increased business was found in plain as well as fancy boxes, odd shapes as well as folded boxes.

As to quantity, more boxes are reported sold than in any previous year. There may be some doubt as to the total amount of business exceeding any previous year, due to the fact that some other years found less boxes sold, but at a greater return. Most gratifying in the increased number of boxes sold is the fact that a much larger percentage of these were used locally than ever before. This might be attributable to widespread efforts to induce dealers to use goods manufactured in the region, although considerable doubt exists on this point. The dealers use hard headed business sense in their purchases; if they can get good material at home for prices commensurate with those asked by Eastern manufacturers, then and then only will they buy at home.

In my opinion the greatly increased demand for boxes in this and other regions is due to the realization on the part of the dealer, be he confectioner or department store operator, that he must utilize attractive boxes in the sale of his goods. More goods are being merchandized in boxes, hence more boxes are demanded and made. The florists who rank with the confectioners in the pioneer use of boxes are using more boxes than ever before, thus augmenting their manufacture. The same might be said for any merchant who can possibly utilize boxes in putting his wares before the public.

Wide awake dealers have been capitalizing on the several holidays of the year and ordering boxes appropriate for the occasion. This spirit has been a boon to the odd shapes especially. In most cases a plain box is used to encase the odd shape, so that the manufacture of plain boxes is stimulated as well. The year has noted a change which has been coming for some time. That is the tendency to choose either a very high grade box or a very cheap one with little or no demand for middle grades.

Another factor working to the advantage of the box making industry is the generally lower prices of materials. The box maker has been able to offer better value at prices approximating those formerly asked for boxes of lesser quality. Board made in the United States has been used in box manufacturing during 1928 more than ever before and has proven just as satisfactory as imported material.

All indications are that 1929 will see all former records in box making broken in this region.



IRVING A. DELINE

Ten Billion Feet of Lumber Cut in 1928

The production of lumber during 1928 in the Douglas fir region of Oregon and Washington totaled approximately 10,141,286,000 board feet, according to tentative figures from a first-hand study just completed by the West Coast Lumbermen's Association and announced to the stockholders of the lumber organization at the annual meeting in Tacoma, on January 25. Of this total, Oregon produced 3,584,292,000 board feet, and Washington 6,556,994,000 board feet. Six hundred and seventy-eight mills were included in the survey as active producers during the year.

Douglas fir, West Coast hemlock, Western red cedar and Sitka spruce are included in the totals. By districts, the production was as follows:

OREGON

Medford	80,370,000
Coos Bay, Marshfield and vicinity	341,179,000
Willamette Valley	961,111,000
Yaquina Bay, Toledo and vicinity	179,099,000
Tillamook	405,414,000
Columbia River	1,617,119,000
Total	3,584,292,000

WASHINGTON

Columbia River	671,113,000
Willapa Harbor	178,723,000
Centralia-Chehalis	517,885,000
Grays Harbor	1,324,126,000
Tacoma	1,153,458,000
Seattle	1,188,925,000
Everett	945,054,000
Bellingham	577,710,000
Total	6,556,994,000



"Extended utilization of waste, particularly woods waste, will come. Just to say that utilization is economically not feasible merely begs the question and admits ignorance of how it may be profitably obtained."—Heritage.

Problems...

of the Western Pulp and Paper Industry and Forest Utilization

By C. C. HERITAGE, In Charge
Section of Pulp and Paper
United States Forest Products Laboratory, Madison, Wis.

SOME remarkable facts relating to the pulp and paper industry are these:

The per capita annual consumption of paper in the United States is now over 200 pounds. Importation of paper into the United States is steadily increasing and at a greater rate than domestic production. Such increase is depressing not only the use of our land and the growing of timber crops but also the normal expansion of industry with population. Per capita consumption as well as actual population is mounting. The domestic regions containing large stands of suitable timber have but relatively small manufacturing capacity for pulp and paper. The old staple pulp woods are giving way to newcomers. New regions are developing into pulp and paper producing centers. Modified processes are appearing and are being commercially developed. The use requirements of the consumed product are looming more and more important.

What role are the Western states playing in this situation and what will the future hold for them? The answers to these questions involve the wisdom of expanding in general the number of species of timber that are potentially suitable; the extent to which this possible expansion concerns the Western species; the extent to which this expansion involves competitive species elsewhere; the present state of the industry in the West; and, finally, the determination of the specific problems, in species, in integration of timber-using industries, and in wastes, that are immediately important.

The Importation and Production Situation in the United States

The percentage increase in importation, compared to that for production, over the four years from 1922 to 1926 is as follows (1, 2):¹

	Importation Per cent	Production Per cent
Pulp wood	31	22
Wood pulp	38	25
Paper	84	42

These figures mean simply that the relative increase in imports greatly exceeded the relative increase in production.

The pulp wood imported was three-quarters spruce. The states receiving it were principally those of the Middle and North Atlantic region. Sulphite pulp, both bleached and unbleached, was being imported in the greatest amount and its importation was increasing at the highest rate. Except for mechanical pulp, over half our pulp requirements were originating in Europe.

Paper imports, which had almost doubled in those four years, were largely newsprint:

A few facts regarding consumption and production are these:

The species increasing in consumption most rapidly were, in order: pines, spruces, and hemlocks (no dis-



C. C. HERITAGE

In the late summer of 1928 Mr. Heritage, in company with Mr. C. P. Winslow, director of the U. S. Forest Products Laboratory at Madison, made a visit of several weeks duration to the forest regions of the Pacific Coast. The purpose of that visit was threefold:

1. To learn on what species of Pacific Coast woods the laboratory could most profitably concentrate its studies.
2. To learn the condition of the wood as it was available for the Pacific Coast pulp mills. This included a study of standing timber, logging wastes, saw mill wastes, logging conditions, soundness of timber and similar phases.
3. To learn for what commercial grades of paper the Western woods were best suited.

Mr. Heritage had not made a personal visit to the Pacific Coast before 1928. He came, therefore, with an open mind and disinterested viewpoint. In this article he has summed up the problems of the Pacific Coast pulp and paper industry as seen by the trained technical mind viewed against a background of the industry as a whole.

¹ Reference is made by number (*italic*) to the literature cited on page 130.

inction between Eastern and Western species is made in the statistics). The greatest increase in the production of wood pulp took place in New York. The increase in over-all production was about equally divided among mechanical, sulphate, and sulphite. The increase in consumption of wood pulp was far greatest in sulphite. In terms of pulp wood the percentage of our annual paper consumption that we ourselves have supplied is: 1918, 71 per cent; 1922, 49 per cent; and 1926, 45 per cent. Furthermore, 16 per cent of that which we imported in 1926 originated elsewhere than on the American continent.

Statistics Show Dependence

The following table summarizes the situation for 1926 in comparison with 1922, presenting the kinds of paper and the combinations of import with domestic manufacture under the following headings:

1. Domestic wood, wood pulp, and paper.
2. Imported wood; domestic wood pulp and paper.
3. Imported wood pulp; domestic paper.
4. Imported paper.

Comparison of the paper and the paper material produced domestically and imported during 1922 and 1926, expressed as percentages of the total wood pulp contained respectively in each grade of paper consumed in the United States.

	Book (a)				Board (b)				Wrapping				Newsprint			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1922	58	17	26	c	61	6	27	8	66	6	27	3	34	11	14	42
1926	61	14	24	c	56	10	34	2	58	7	36	1	24	12	12	53

(a) Assumed to contain 75 per cent new wood pulp—soda and sulphite.

(b) Assumed to contain 20 per cent new wood pulp—mechanical, sulphite, and sulphate.

(c) Very small.

In three out of four cases (1) had decreased, and (2) had increased; in two cases (3) had increased, and in one case (4) had materially increased.

The preceding data are purely statistical. In interpreting them, U. S. D. A. Bulletin 1241 reads, "The exceedingly rapid growth and present volume of pulp and paper imports in themselves alone more than justify an inquiry into the situation. * * * There are outstanding reasons for creating a permanent domestic pulp and paper industry that can meet our entire needs founded on home-grown timber. From the standpoint of national interest we obviously should not allow ourselves permanently to remain subject to losses occasioned by the stoppage of imports of a product so necessary to our national life as pulp wood."

If it is granted that we should be self-contained as a nation, then it is obvious that the problem is first to reduce the importation of pulp wood, then pulp and paper, and finally to provide for the needs of an increasing population consuming at a steadily increasing per capita rate.

The most serious phase disclosed is our increasing dependence upon imports of spruce, of mechanical and sulphite pulps, and of the papers made therefrom. Some of the states showing the greatest increased consumption of pulp wood and production of pulp are those paying the highest prices for pulp wood and having the least wood reserves.

The Pulp and Paper Economics of the Western States

Clapp and Boyce (1) state, "To produce at home the pulp and paper now imported and probably in part at least to absorb pulp-wood imports, it will be necessary to turn to new regions. * * * the three Pacific Coast states offer exceptional opportunities in this

respect." The natural conditions necessary for the profitable manufacture of pulp and paper in the Pacific Coast states have been discussed by H. P. Baker (3). One statement is especially pertinent to this discussion: "It seems very probable also that it will be impossible to produce larger quantities of wood to the acre on the essential forest lands of the Northwest than in the East or South." Ross and Konzo (4) give a general economic survey of the many inducements offered by the Pacific Coast states, discussing all the factors involved. They say without qualification that the cost of construction of pulp and paper plants is decidedly lower on the Pacific Coast. With regard to over-all manufacturing cost Mr. Baker (3) says, "Generally speaking, the cost of producing pulp and paper on the West Coast is not materially different from that in the mills on the East Coast with the one exception of pulp wood."

Tidewater Location Cuts Cost

Since the Eastern and Western species of spruce and hemlock are not tabulated separately (2), it is impossible to quote accurate average prices of pulp wood by species. It appears, however, that in 1925 imported spruce in the East was at least \$18 a cord. Assuming that low-grade Sitka spruce saw logs are comparable in suitability, the corresponding current quotations in the Pacific Northwest are \$12 per M log scale. Authorities agree that this unit of measure will average $1\frac{2}{3}$ cords. Hence one cord, which is roughly equivalent to a ton when dry, is currently valued at about \$7 at Western tidewater. The margin on the cost of wood between the East and the West is therefore approximately \$11 per cord, leaving the utilization of sawmill waste out of consideration. The present ocean freight rate on pulp, Pacific Coast to Atlantic Coast, is \$6 per short ton in bales of proper density. The advantage in wood cost against transportation cost increases as the quality of the pulp or paper produced becomes higher; such increase is represented by decreasing pulp yields.

The matter of satisfactory quality of pulp or paper for the desired use, at a price corresponding to the required quality, is not the only consideration in marketing products from a new region. Other factors are the beliefs of long standing that Eastern pulp-wood species are superior and that imported pulps are superior. Referring to the latter belief, this statement is very interesting (1), "No wood is cut primarily for the Swedish pulp mills. Thinnings, * * * poorer logs, and sawmill waste constitute the entire supply of raw material for pulp."

Progress in the Western States

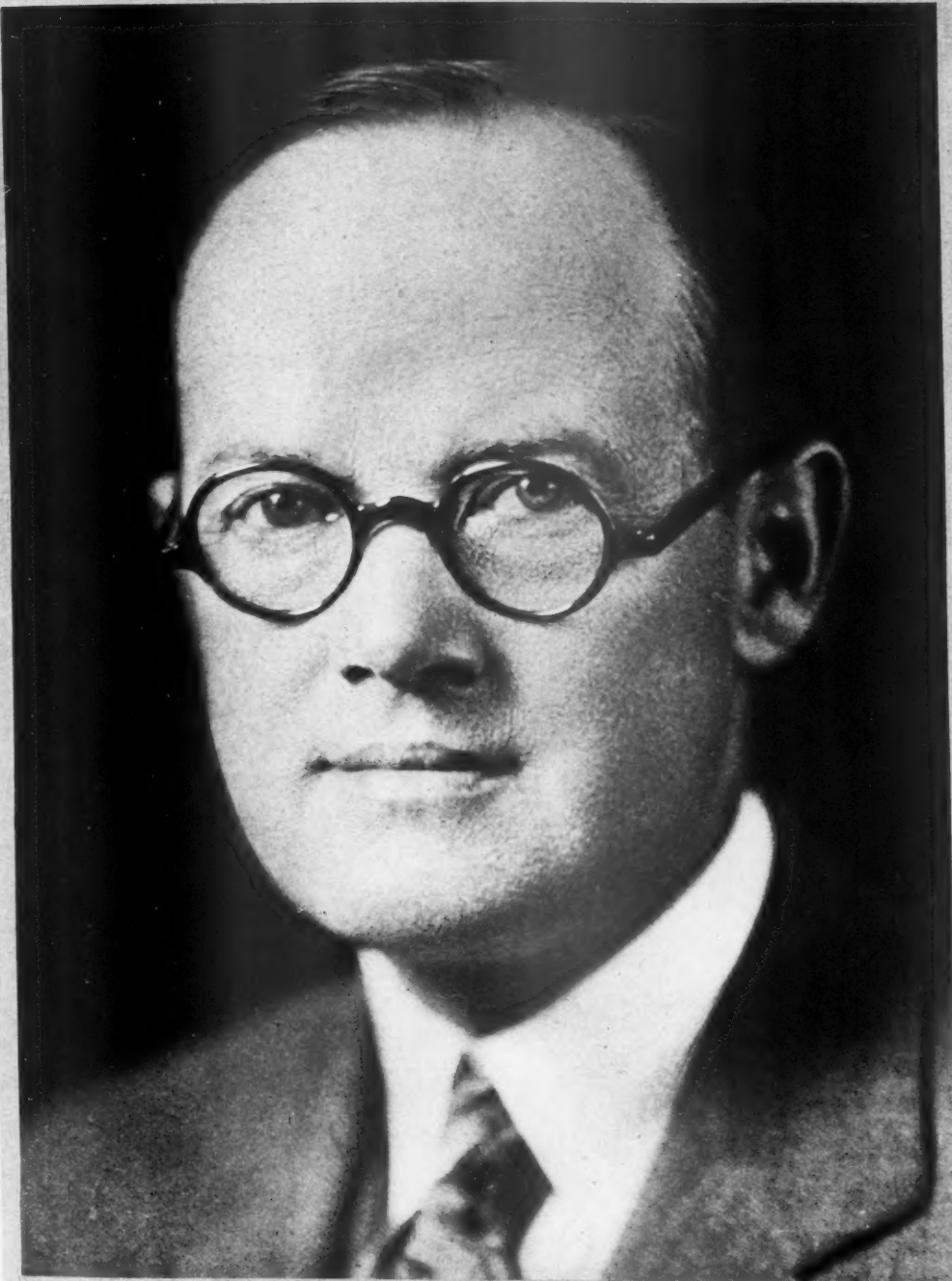
The most serious factor in the whole situation is that the great proportion of present stands of pulp wood in the United States is in regions that now have few pulp mills. The wood must be brought to the mill or the mill to the wood, usually the latter.

The opportunity of the Western states lies in producing the strong, lighter-colored pulps and papers; present expansion there is demonstrating this fact.

The species being used in the West include Sitka spruce for mechanical pulp, Western hemlock for mechanical, sulphite, and sulphate, some true firs for sulphite and groundwood, some Douglas fir for soda and sulphate, and black cottonwood for soda. Satisfactory pulps and papers of wide variety, including the finest

(Turn to page 122)

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














































































Supplement to Pacific Pulp & Paper Industry

EDWARD M. MILLS

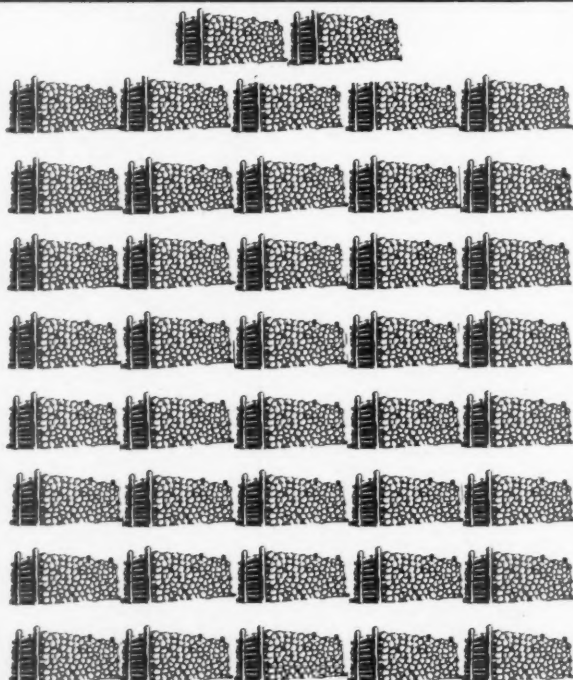
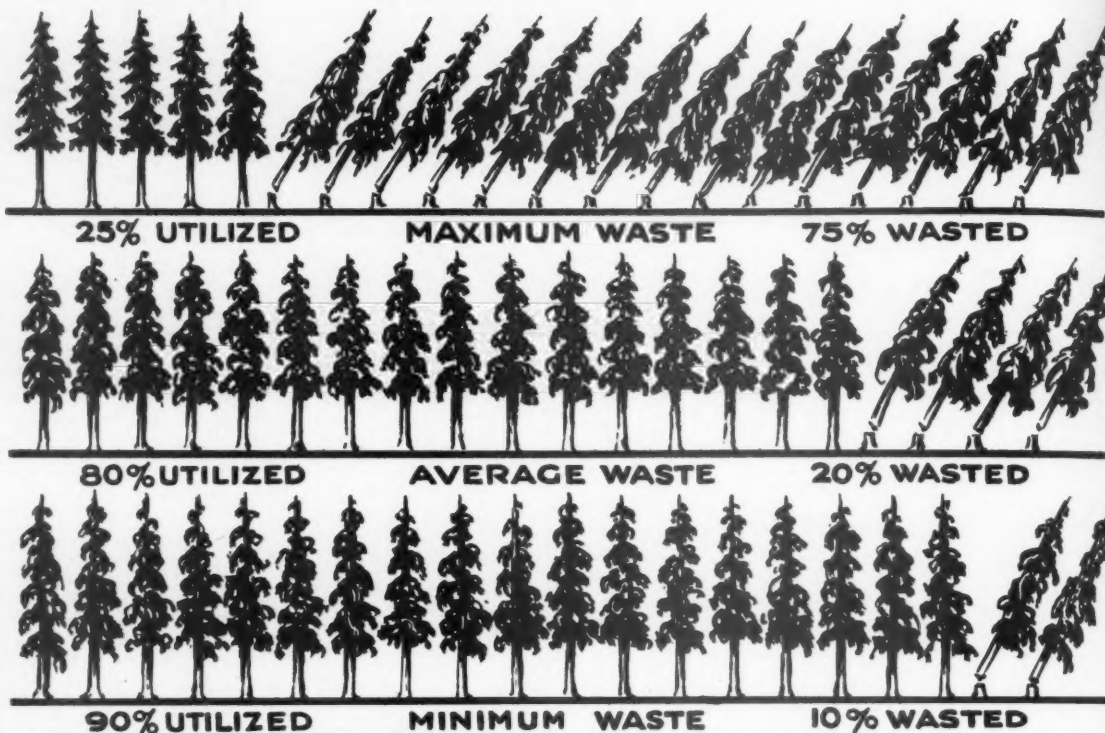
Executive Vice-President, Crown Zellerbach Corporation



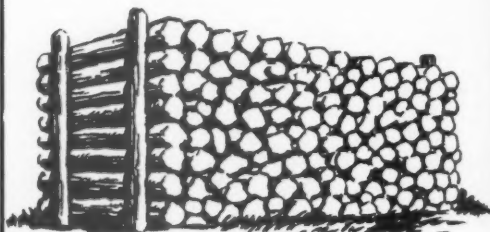
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CALIFORNIA	OREGON	WASHINGTON	BRITISH COLUMBIA	ALASKA	IDAHO	MONTANA	ARIZONA N.MEXICO	COLORADO	REMAINING ROCKY-MOUNTAIN REGION
	245,797,056 	135,860,852 	<div>THE TIMBER STAND OF THE WEST (M. FT. B.M.) THIS GRAPH IS BASED ON FIGURES RECENTLY COMPILED BY THE U.S. FOREST SERVICE TO SHOW THE COMPARATIVE SIZE OF THE LEADING SOFT WOOD STANDS IN THE WESTERN UNITED STATES, BRITISH COLUMBIA & ALASKA. GRAPH CONSTRUCTED BY PACIFIC PULP & PAPER INDUSTRY</div>					DOUGLAS FIR <i>Pseudotsuga taxifolia</i>	
39,114,000 			75,972,723 		17,530,000 	12,180,000 	3595,500 	1,387,540 	1,302,199 
77,176,000 	75,549,759 	13,731,367 	4,207,924		17,810,000 	11,137,000 	30,053,655 	2,582,474 	3,799,490 
	25,445,179 	60,204,693 	64,111,998 	52,634,000 	950,000 		WESTERN HEMLOCK <i>Tsuga heterophylla</i>		
50,262,000 	21,216,424 	24,064,578 	32,953,362 		7,900,000 		946,328 	1,638,360 	501,105 
70,000,000 	RED WOOD <i>Sequoia sempervirens</i> 150,650 	31,964,380 	77,968,629 	6,104,000 	4,750,000 	366,000 	WESTERN RED CEDAR <i>Thuja plicata</i>		
	587,530 	1,220,560 	58,898,605 		3,650,000 	4,652,000 	1,514,329 	13,826,961 	5,226,776 
	5,818,126 	953,868 	11,861,202 		7,260,000 	14,134,000 	LODGEPOLE PINE <i>Pinus contorta</i> 	4,950,560 	7,935,512 
	2,655,330 	8,472,561 	16,165,345 	18,511,000 			SITKA SPRUCE <i>Picea sitchensis</i>		
INCENSE CEDAR <i>Libocedrus decurrens</i> 8,609,000 		465,098 	1,737,638 	104,174 	ALASKA CEDAR <i>Chamaecyparis noothkatensis</i> 4,055,735 		2,000,000 		
	4,457,566 	3,217,510 	3,151,788 		5,540,000 	11,703,000 	WESTERN LARCH <i>Larix occidentalis</i>		
31,928,000 	SUGAR PINE <i>Pinus lambertiana</i> 2,433,116 	480,941 	2,698,940 		16,750,000 	855,000 	WESTERN WHITE PINE <i>Pinus monticola</i> 760 		
7,416,000 	2,154,244 	2,369,997 	787,949 	879,000 	2,300,000 	3,045,000 	309,280 	117,788 	1,153,365 
MISCELLANEOUS									

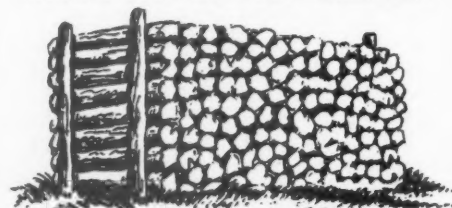
LOGGING WASTE IN THE DOUGLAS FIR REGION



42 CORDS
AVERAGE WOODS WASTE PER ACRE
IN DOUGLAS FIR REGION TAKING IN-
TO CONSIDERATION ONLY SOUND WOOD
OF CORDWOOD SIZE OR LARGER



6,448,000 CORDS
ANNUAL WOODS WASTE
IN DOUGLAS FIR REGION OF
WASHINGTON AND OREGON



5,484,517 CORDS
TOTAL ANNUAL 1928
CUT OF PULPWOOD IN THE
UNITED STATES

PREPARED BY
PACIFIC PULP & PAPER INDUSTRY
FROM DATA COMPILED BY THE U.S. FOREST SERVICE

Logging Waste

For Pulpwood in the Douglas Fir Region*

By ALLEN H. HODGSON

Associate Forester, Office of Forest Products,
U. S. Forest Service, Portland, Oregon

*Waste, Wherever You Find It, Is a
Liability Rather Than an Asset.*

6,448,000 Cords
of Sound Wood Are
Destroyed Annually

LUMBERING the world over has always been accompanied by accumulations of materials which could not profitably be used. Only in thickly-populated countries, where wood is scarce and labor is cheap, has the problem of woods waste been reduced to a minimum.

Here in the Douglas fir region of western Oregon and Washington, which contains about one-fourth of all the remaining softwood saw timber in the United States and where the lumber industry is sawing out not far from one-third of the lumber produced by the nation, the woods waste is exceedingly heavy. There is probably more waste per acre left after logging here than in any other timbered region that has even been logged. The causes for this condition are many. Some are due to nature, uncontrollable by man, others are the result of complicated economic forces, and many may be attributed to the common methods and practices used in logging.

The forests of most timbered regions in the United States lend themselves to the "selection" method of cutting under which only the desirable or merchantable trees are removed and the rest of the forest is left intact to continue its growth. This method of cutting, however, is not practiced in the Douglas fir region. Instead, the "clear-cutting" method is used.

Under the clear-cutting method, as practiced here on privately-owned lands, all of the merchantable trees are felled and logged without regard for the presence of small or less desirable trees. The logging operations are designed to take out large sawlogs rather than pulpwood and the huge machinery cannot profitably be used to handle the small trees. The undersized trees, as a rule, are mashed down or pulled over by the process of logging. These, with large quantities of culled and broken logs, tree tops, windfalls and other litter, make up the "slash" or waste material.

Woods Waste Studied

Until recently little thought was given to this waste material, which is now left in the woods to rot or to be burned, for the reason that under existing economic conditions and manufacturing practices the bulk of it has very little or no value. In the past few years, however, considerable interest regarding the value of the logging waste as a source of raw material for the paper pulp industry has been evidenced from several quarters.

The office of forest products research of the Forest Service, the purpose of which is to make the growing of timber more profitable by increasing the possibilities

in the utilization of both used and unused classes of trees and logs, has therefore carried on and has recently completed a study of woods losses in the Douglas fir region. This is an initial study in the form of a general survey, to be followed up by other investigative work designed to assist in the reduction of logging

THE LOGGING WASTE SURVEY—

Required 2½ years to complete.

One hundred fifty sample acre plots in 24 different logging operations measured in detail.

Revealed annual woods waste of 6,448,000 cords of sound wood of cordwood size or larger.

Maximum waste of 88,000 b. f., or 176 cords, per acre, equivalent to destruction of ¾ of original stand.

Average waste of 21,000 b. f., or 42 cords per acre, equivalent to 1/5 of original stand.

More than 2,500,000 cords of waste made up of the preferred pulpwoods, namely Western hemlock, Sitka spruce and "white" firs.

waste by learning and pointing out ways and means that will improve utilization. These studies will be more specific in character.

This survey extended over a period of two and one-half years and was conducted in the Puget Sound, Grays Harbor, Willapa Harbor, Columbia River, Willamette Valley and Coos Bay production centers. Accurate measurements were taken on one hundred and fifty carefully selected sample acre plots on the logged-off lands of 24 representative logging operations. The investigation has provided basic data upon which reasonably accurate estimates regarding the quantity and character of logging waste in the Douglas fir region may be based.

The survey has brought out the fact that the yearly accumulation of woods waste, cordwood size and larger, totals in round numbers to 3,224,000,000† board feet or 6,448,000† cords of sound wood; as a basis for comparison it may be of interest to note here that in 1926 the total pulpwood cut in the United States was 5,489,517 cords. More than one-third of this logging waste or about two and one-half million cords is made up of western hemlock, "white" firs and Sitka spruce, woods in demand for sulphite and mechanical pulp, while

*Paper read at the first Pacific Coast Pulp and Paper Conference, held at the University of Washington, Seattle, October 26, 1928.

†Figures are tentative and are subject to adjustment when carefully checked for final report. See also editor's note at end of article.



A "battlefield" in the path of the logger, giving some idea of the type of material left behind. It is estimated that 6,448,000 cords, the type of logging waste shown, is wasted annually in the Douglas fir region in Washington and Oregon.

nearly two-thirds or in the neighborhood of four million cords, is composed of Douglas fir and western red cedar, woods having inferior pulping properties, at least when reduced by present commercial practices.

Waste Per Acre High

The results of the survey show very wide differences in the amount of logging waste left in the woods by individual operators. In some cases it was found that as much as 88,000 board feet per acre or three-fourths in volume of the original stand was being left in the woods as waste while in other operations these losses amounted to only 6,000 or 8,000 board feet per acre or only about one-tenth in volume of the original stand. As an average for the entire region the loggers are leaving wood, cordwood size and larger, as waste, amounting to 21,407 board feet per acre. This represents nearly one-fifth in volume of the original stand of timber. In many parts of the world a forest averaging 21,000 feet B.M. or 42 cords of wood per acre would be considered as a very heavy stand of timber. In addition to the woods waste accounted for in this paper there is a considerable quantity of wood too small to be considered as having any potential value. This consists of shattered logs, splinters, small tops and limbs and amounts to about 7 per cent of the original stand of timber.

Billions of Feet Wasted

An analysis of the total annual woods waste, cordwood size and over, amounting to 3,224,000,000 board feet, shows that more than one-third, or over a billion board feet, is in the form of sawlogs, which under present or slightly improved economic conditions the loggers could reasonably be expected to remove from the woods for use as lumber. At least three-fourths of these logs would fall within the specifications of the lowest existing commercial log grade or higher grades. About one-seventh of the woods losses or nearly 442 million feet is in the form of sawlogs, but smaller than those referred to above.

The material classified as potential sawlogs approxi-

mates nearly one-half of the total woods waste which, as mentioned before, amounts to nearly three and one-quarter billion feet.

When a piece of waste wood met the specifications of a sawlog as designated by the plan of work, it was classified as such since the sawlog is the most common form in which raw wood is bought and sold here on the Coast and in this form the material can be converted into other units such as cordwood, shingle bolts, etc., as desired. As stated, about one-half of the woods waste was classified as sawlogs. The balance of the material annually left in the woods, constituting the other half of the logging waste amounts to 1,617,452,000 board feet. This is composed of pieces of wood that are not suitable for sawlogs but which could be used as shingle bolts, cedar posts and, in the form of cordwood, as pulpwood and fuelwood. There is also included some material in the form of cedar telephone and telegraph poles. The latter could be cut into logs, but would probably have a higher value as poles.

New Processes?

Most of the woods waste, as found on the ground, is in the form of logs broken at both ends (44.2 per acre), tops broken at large end (33.7 per acre), trees pulled down (28.4 per acre) and logs broken at one end (14.5 per acre). These four classes of material are equal in number of pieces to three-fourths of all the slash, there being 144.7 pieces of wood found on the average acre, with an average volume of 116.2 board feet per piece. (These figures do not include standing trees, snags or excessive stump heights.)

In this day of applied science when such rapid commercial expansion of newly discovered processes and inventions is being made, it is difficult to forecast possible developments in the use of woods waste. It is reasonable to believe, however, that sooner or later profitable ways will be found for converting this enormous supply of raw material, containing so many valued physical and chemical properties, into articles of commerce.

(Turn to page 128)

Pulp ... and the Logging Industry

As Seen From the Forest-Owning Point of View*

By E. T. ALLEN

Forester in Charge

Western Forestry and Conservation Association

PULP production will increasingly effect three great changes in the outlook of Pacific Coast forest industry. There will be a changed view of the fiber substitute for lumber by operators who can profitably divert some of their existing timber to such utilization; without, however, quite such a change in the view of operators who cannot. It is not my business to predict how this may affect the solidarity of manufacturers' associations and advertising campaigns.

There will be a diversion of existing timber, seeking closer utilization, to strictly paper uses that do not raise the question of competition with lumber but will similarly modify woods and mill practice. To the logger, both mean innovation. He will be required, on the one hand, in order to save material previously unmarketable, or desire, on the other hand, to get a greater volume to cut his railroad and other charges, to study a new line of values and, to some extent, to devise new methods of logging and marketing so the lumber and pulp material will each be taken out to best advantage. This again, is not within my province, further than to remind you that nowhere more than in the pulp business is economical volume assembly essential. Some kind of a sawmill can always move to a timber supply, if transportation cost is the problem. A profitable pulp plant is too big and expensive to be anything but permanently located where sufficient raw material can be brought to it cheaply. This is why wood need not greatly fear the the lesser area production of other vegetable products suitable for pulp. It is also why pulp manufacture is not going to afford a sure salvation for every scattered, remote timber investment of logging operation. Pulp manufacture is going to have definite and permanent centers, demanding a concentrated and permanent raw material supply.

Thirdly, just because of the foregoing, we reach the angle it is permissible for me to discuss without entering the expert field of lumberman, pulp expert or logger. This is the inevitably-to-be-changed view of the forest land owner, and of the public whose edict as to fire hazard and taxation will affect his decision, of the promise that lies in cut-over land. And it has two aspects: The promise that lies in this land alone, and the promise this land gives to pulp enterprise that figures first on virgin timber supply, but cannot risk

being stranded when that is gone.

To any far-seeing element in the community, this has again a profound significance from viewpoints not otherwise interested in pulp production at all. The problem of our Pacific Coast forest states is to keep their forest lands working; affording wages to labor, revenue to support every professional and commercial element, market for agricultural products, and tax revenue to relieve all in the support of government roads, schools and other community costs.

The danger which confronts us as forest states is equally evident to any student of the situation. It is that carrying costs threaten to deter the forest land owner from keeping his land productive. If he can see no profit ahead, he will not keep his land, pay taxes on it and protect it, to say nothing of investing further to increase its future productivity. If he does none of these things, it will revert in bad condition to public ownership. A public correspondingly burdened with lessened tax

Get your mind on methods that do not destroy these pulp values, but that take care of them even if this violates some old beliefs that good logging is to get a bigger donkey and a heavier line and a longer crane than anybody else ever had and raise hell uphill with the big logs.

revenue is not likely to assess itself to keep the land protected and productive. The government will probably refuse to keep up its co-operative assistance under the Clarke-McNary law. Other forest land owners will have excessive costs and our co-operative patrol organization will break down. The world-wide reputation our Pacific states have acquired for high-standard co-operative forest protection and assured forest productiveness will be destroyed.

Under such circumstances pulp manufacture capital will see no security for the future. Lumbermen will see no more. Our vaunted Pacific Coast system will go bluey. And if it does, the entire present federal principle of co-operation, which is based upon our example, will go with it. We shall return to chaos and afford corresponding nutriment for the radicals who want all forest industry put under the bloody club of absolute public regulation which we know cannot cure any such evil. If we cannot live unregulated, we cannot live regulated, and we will let our forest land go. And with it, since the public will be correspondingly overburdened so it cannot meet the crisis, will go the future of lumbering and pulp manufacture. We will burn up. The logger will survive here and there, but he won't be what he used to be, 40 long years ago.

Now, what is the other side of the picture? As I see it, this: What we want is quick rotation. We have

*Address delivered at the 19th annual meeting of the Pacific Logging Congress, Portland, October 24-27, 1928.

been bred in the tradition of good saw logs, and when we apply all our forestry knowledge we find it takes from 40 years (when we can cut ties and trap piles), to 50 or 60 years, when we can get lumber logs of a sort. So we calculate guess-work stumpage values in 40 to 60 years, and carrying costs as we see them now—taxes and fire protection—and arrive where we see good results if we have good reproduction well on the way, but doubt or loss if the carry is too long. A lot depends on what interest we demand, compounded or otherwise. So we are starting to figure on pulp possibilities, for on many lands pulp wood can be cut in somewhere from 25 to 40 years from now, perhaps sooner if reproduction is far enough along.



E. T. ALLEN
Forester In Charge
Western Forestry and Conservation Association

So I go east and consult my friends in the pulp business and propound the question about like this: There are three ways to figure future pulp possibilities for the forest land owner. One is the population increase with the same per capita of paper consumption. Another is the probable ingenuity of pulp engineers and researchers, developing new products like rayon, firtex and masonite. Both the foregoing are stock ideas to which I can add nothing. But there is a third we hear little about. Is not the alleged future timber famine, together with the demand of both forest land owners and public that forest land be kept productive and earning, going to result in the shortage of old style lumber being met not by going without, or by turning to brick, celotex and whatnot, but by a synthetic lumber made of wood? Who will care much what form of wood cellulose is used, as long as it keeps forest land working to the benefit of owner and community?

Considering these possibilities, is the East and South going to be able to grow enough wood to meet the demand, or must the Pacific Coast be called on heavily

in 25 or 30 years and thereafter; so anything we can do in the way of growing wood for some sort of fiber, for paper or synthetic lumber, will be marketable on a short rotation that shows better promise than waiting for sawlogs? If so, we can hold our whole system together, taxes, fire prevention and all.

The best answer I have on this so far is encouraging. Nobody knows exactly. The American Paper and Pulp Association is only now beginning a survey of productivity. We don't know whether Canada will shut down on export to this country or not. I am trying, as a Pacific Coast forest owners' agent in such matters, to keep up with all these developments. But it now looks like this to the conservatives:

The kraft paper and synthetic paper demand will be met better than any other by the tremendous productivity of the southern pine lands. It will give a chance to Douglas fir and western pine, on an earlier rotation than saw timber, but with a lot of competition. But the higher grade paper pulp demand, including the sulphite and soda pulps as well as the ground pulps, is going to comb every possibility.

Value of Second Crop

This means that our spruce, hemlock and white fir will come into their own, and particularly that after the existing virgin timber supply thereof goes, in a few decades, such second-growth will be merchantable at an age much less than is required to make saw logs. It may easily be that second crops of these will be more valuable during our most critical period than second crops of Douglas fir and other species whose best chance lies in an older product with correspondingly high carrying costs; although we should not overlook possibilities of thinnings from the latter or that they may develop higher paper use than is now accorded them. It has been said that the ideal exploitation of a forest is to make thinnings for pulpwood while the body of the stand grows on to make saw timber all the faster for being so thinned. This gives early cash return, salvages material that otherwise dies and rots, and improves the saw timber project.

Reseeding Is Rapid

Therefore, we get a new conception. Our sulphite woods that I have mentioned—hemlock, spruce and the white firs—reseed readily and grow rapidly along the coast and in the mountains like the Cascade slopes, north Idaho and the Sierras. Wherever such reproduction is tributary to natural pulp headquarters, developed first to utilize virgin timber of the same kinds, it looks like a particularly good bet, for plants so established will pay well for young stuff nearby rather than freight on distant material.

So we begin to see that the picture we have been building of our regional advantage in producing the country's next saw timber, from our easily reproduced and fast-growing Douglas fir and pines, is improved instead of discounted by our proportion of species hitherto considered less promising, but perhaps actually even more promising because of their short-rotation adaptability to the kinds of pulp the rest of the United States will be shortest of 25 or 30 years hence. All encouraging us to keep and take care of all our forest land, giving this promise to the various secondary wood-using industries, of which pulp manufacture is only one, and which ask permanence if they are to come here and help us through. This same picture we should

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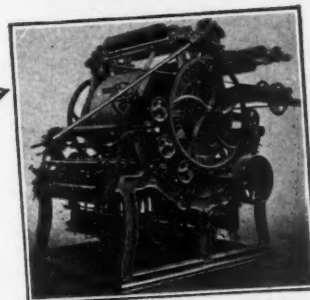
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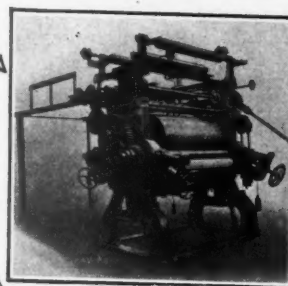
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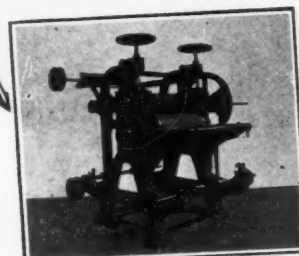
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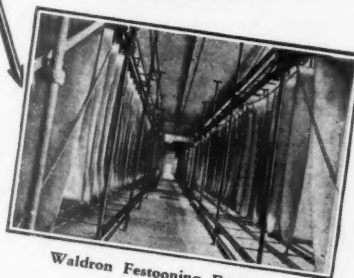
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Hook tenders and choker men working in a characteristic tangle of logs and underbrush in the timbered slopes of Western Washington. The smaller trees left standing, mostly hemlock, will be knocked down as the big logs are snaked out by the high lead lines. The view gives a good idea of Pacific Northwest logging conditions and the circumstances which give rise to such tremendous logging waste.

display to our legislatures, tax gatherers and public, so they may do their part to make it a dependable one.

It is also my duty here, I suppose, to give you the best information available on the productivity of the lands bearing these pulp species. Unfortunately, the older sawlog tradition has largely dominated scientific research of this kind, devoting it more to Douglas fir, the Pacific Coast pines, etc. But I can give you some ideas.

Pulp Stands Grow Rapidly

It is true in the main that the high-value pulp woods, while not yielding large-diameter saw timber as fast as some others, do yield cord volume per acre of utilizable pulp size quite as fast if not faster. They stand shade better. Instead of developing a young forest of only the vigorous dominant trees which are able to keep their heads in the light, reaching sawlog size early but with the smaller trees shade-killed and wasted, which is what typically happens in pure Douglas fir, they compose a much denser stand of trees that grow slower but are not shade-killed. The result is an early heavy volume-production of six to twelve inch stuff; true whether it is a pure stand of shade-bearing species like hemlock, or whether hemlock and white fir are mixed with Douglas fir and not shade-killed, as the smaller Douglas firs are, by the dominant trees in the stand. I may say in passing that we see much the same thing in pure young Douglas fir that grows so densely on poor quality gravel soils—very heavy volume in ties and cord products up to say 50 years, because there are fewer large trees to shade-kill the rest, although a longer wait for sawlogs and not as heavy

a production of these eventually because good growth does not continue as long as on better sites.

Thus when we look over second-growth yield tables prepared by foresters for our leading Pacific Coast trees, computed by log scale and on log standards requiring certain diameters and heights, we may miss entirely the production of the young forest before it has met such requirements, or what it contains below such requirements. I can give you a good example. In 1899 and 1900, 28 years ago, I directed a dozen or more men in making yield studies of fir and hemlock and produced a government bulletin on western hemlock, printed in 1901, that showed, among other things, going even into tan bark possibilities, that pure hemlock second-growth in good localities would at 50 years, yield about 10,000 feet to the acre and at 70 years, yield over 40,000 feet with no defect deduction and about 33,000 feet with theoretical cull. But I was reckoning no tree merchantable that would not give a 20-foot log, 12 inches at the small end. At that time, the average Douglas fir top left in the woods on Grays Harbor was 33 inches.

Yield Tables Arbitrary

In preparing this talk, I went back to my basic second-growth hemlock figures and found that to produce the above prophecy I reckoned no tree that would not have a stump diameter of 14 inches and I only found 55 of these to the acre in the best pure second-growth hemlock 55 years old. But the very same stand had 126 hemlocks and 14 spruces and cedars, or 140 trees in all, that were six inches and over in diameter, which is pulp size, and their average diameter was eight and

(Turn to page 126)

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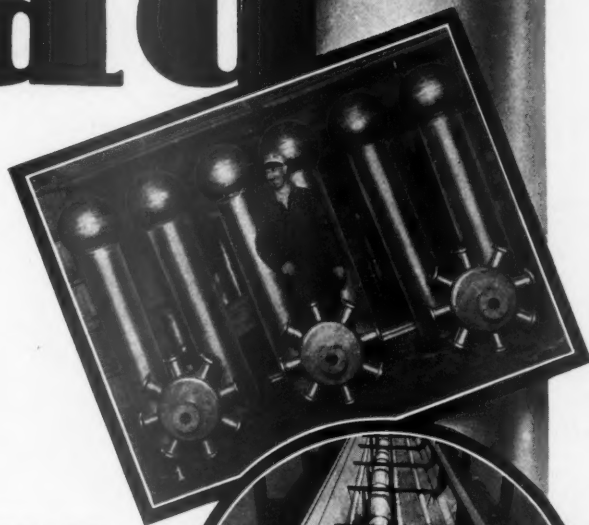
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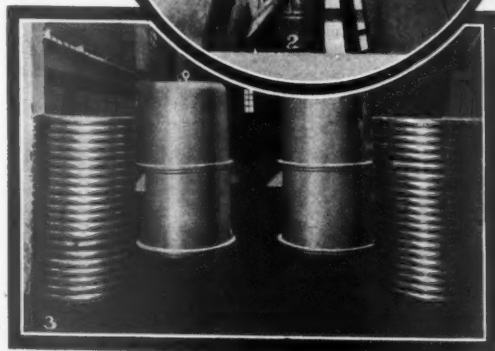
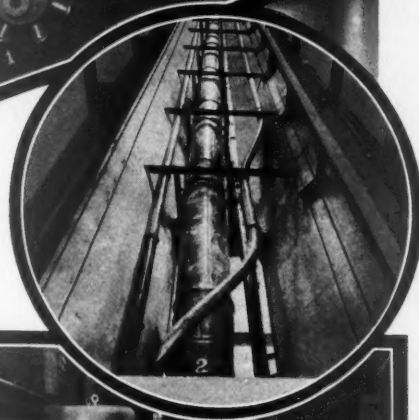
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Forest Taxation

An explanatory article which points out what the Forest Taxation Inquiry is striving to do, and how it is conducting its work in the Pacific Coast States.

By FRED R. FAIRCHILD

Professor of Political Economy in Yale University
Director, Forest Taxation Inquiry (U. S. Forest Service)

IT is a pleasure to accept the invitation of PACIFIC PULP AND PAPER INDUSTRY to present to the readers of its Annual Review Number a brief account of the researches of the Forest Taxation Inquiry in the Pacific Northwest.

Our attention has been attracted to this region ever since the Inquiry's organization. The plan of study which we have adopted involves the selection of key states representing conditions typical of the several important forest regions of the United States, and the Pacific Northwest was naturally regarded as the region in which we should study particularly those aspects of our problem which relate to the taxation of the virgin forests. Personally I have looked forward to this opportunity to make good what I had long recognized as a serious gap in my own knowledge of the forest tax problem, a lack of which some of my western friends have good naturedly reminded me from time to time.

It was somewhat of a surprise, therefore, upon our arrival in Oregon last summer, to find the chief interest of the people of the region directed, not to the question of the taxation of virgin timber, but to the impending crisis of the cut-over lands. However, with the experience gained from our Lake States study fresh in mind, it was not difficult to adjust our viewpoint. The drift toward tax delinquency, the impending abandonment of private ownership of cut-over lands, and the consequent threat to the splendid organization which has been built up for fire protection; these were facts which could not be overlooked. They indicated a real crisis confronting the cut-over lands and, indirectly, all the forests of the region. Without losing in any degree our interest in the virgin forest tax problem, we were thus impelled to give at least equal attention to the cut-over land situation.

Having thus better gauged the scope of its task in the Northwest, the Inquiry was able, with the assistance of the local officers of the Forest Service and other cooperating agencies, to perfect its plans of operation. Three principal lines of attack were chosen.

First it was decided that, in view of the vastness



FRED R. FAIRCHILD

of the territory and the great difficulty involved in making direct examinations of properties, it would be necessary to call upon the timber owners themselves for assistance. In spite of its well-deserved disrepute among business men, the questionnaire method was adopted, though only after careful consideration and many conferences with representative timber owners and others interested in the project; the object being to limit the questions to those which would be of real use and which could be answered in most cases from available records. Two "Confidential Statements" were finally evolved; one applicable to non-operating blocks and designed to show the amount of tax burden on such timber, its relation to investment, present value, and other carrying charges; the other applicable to operating timber properties and designed to bring out for the lumber industry the relation of taxation to income, investment, and other fixed charges, such as depletion and depreciation. Much information of importance beyond that included specifically under the foregoing heads should be available from these statements. Obviously it was necessary and proper to agree that these statements be held confidential and that the compilations be so prepared as not to disclose any individual situation.

Second Research Field

A second field of research lay in the study of the tax situation, for the state as a whole, but with particular attention to selected counties and school districts in Oregon and Washington. With the assistance of the local cooperating agencies, the following counties were selected as representing different timber and tax conditions within the two states: in Oregon: Baker, Clatsop, Coos, Grant, Klamath, Lane, and Tillamook; in Washington: Clallam, Grays Harbor, and Lewis. Within each of these counties certain school districts were selected for especially intensive study. In Grays Harbor County alone all the school districts were covered. The object is to determine just how the present tax system works in detail, not only as to forest properties, but also as to the other kinds of property which share the burden of supporting public functions. The situation as to area and character of delinquent land was included in this investigation. This part of the work was handled by experienced members of the staff of the Inquiry, with temporary clerical assistance obtained in the different county seats. Valuable help was received from state and county officers, from taxpayers associations, and from interested citizens. Much of such information is from public records.

But the picture would not be complete without an

(Turn to page 140)



“LET IT SQUEAK! no oil till Sunday morning”

Sunday morning they climbed the pole and oiled the blocks. Some pulleys were screeching by Wednesday, most of them were entirely dry by Friday night.

But there was no time to shut down to stop a mere squeak—not with the mill boss yelling for timber every day.

The engineer would occasionally feel sorry for the shuddering “donkey” and soak a rag in oil, tie it on one of the lines and drag

it through a block, hoping to “wipe off enough” to do some good.

The Shell man who came along during this operation one day had a hopeful idea: Perhaps there was some oil that would “stay put” all week. There was. A regular stock Shell mill lubricant that now goes into the bearings Sunday mornings, if some one feels like putting it there. Some blocks, hard to reach, get oiled

once a month or once a season even. But the squeaking, the friction, the rapid wear is no more.

The point is that Shell men are often able to suggest a remedy that works. They are experienced in mill and woods lubricating problems and know their oils thoroughly.

They are available, without obligation, by calling the Shell depot.

SHELL MILL LUBRICANTS

When writing SHELL OIL COMPANY, please mention PACIFIC PULP & PAPER INDUSTRY

British Columbia Interior

and Its Future Prospects for the Manufacture of

Pulp and Paper

By HON. F. P. BURDEN
Minister of Lands
Province of British Columbia

BRITISH COLUMBIA'S interior forest belt is likely to play from now on an increasingly important role in the province's pulp and paper industry. Natural conditions, such as availability of the desired species, adequate water power, easy transportation and so on, are such as to expedite development, and an even more significant factor is the



HON. F. P. BURDEN
Minister of Lands

economic one which is dictating steady encroachment upon the interior as a source of timber supply.

The pulp and paper industry is still young even on the Coast where it is chiefly concentrated at present. None of the large operating mills are seriously fearing early depletion of pulpwood supplies. Some of them hold in their own name large tracts of timber which are sufficient to meet their needs for many years to come, even allowing for extensive increase in their

productive capacity. Others are able to place reliance on the supply of pulpwood from independent loggers many of whom, especially those operating close to tidewater, are taking out large quantities of Douglas fir and cedar for sawmill purposes and in the course of their activity also log considerable spruce and other species suitable for pulping. This latter material they are naturally glad to dispose of to the pulp and paper mills, and so great is this supply that the demand of the pulp and paper mills is more than adequately met.

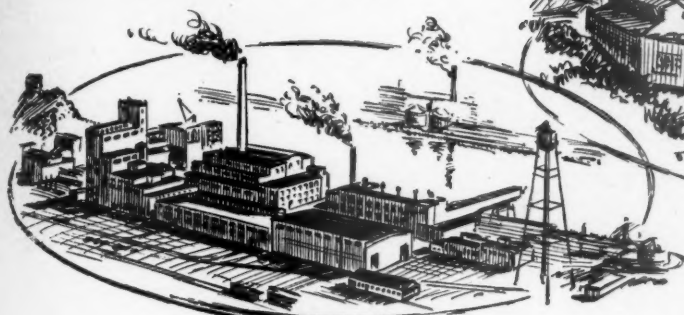
But it is obvious that the pulp and paper industry will not for all time be confined to the Coast timber areas. At present the chief economic justification for concentrating pulp production on the Coast is the advantage of tidewater location for the mills. The offshore export market is at present the chief factor in the trade and coastal location of the mills so as to provide for easy access of ocean-going cargo ships is therefore an essential. Nevertheless the domestic market for paper is growing enormously, and the prairie provinces of Canada and the middle western states are consuming more paper every year. It is this territory that will eventually demand exploitation of the interior pulpwood stands in British Columbia as well as in other inland sections which up till now have lagged behind the coastal strip in pulp and paper output.

Over Production Problem

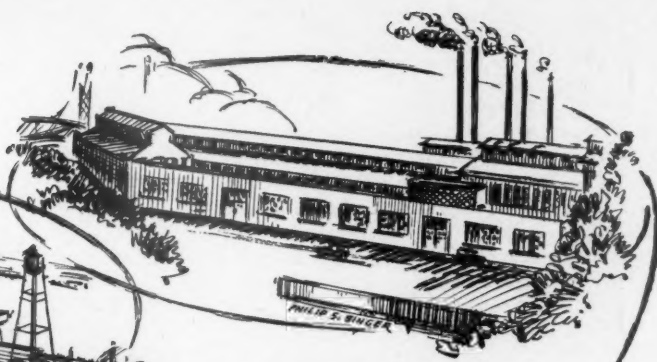
At present eastern Canadian mills are endeavoring to meet a serious problem of over-production and the market is not satisfactory from the standpoint of investment in new mills whose production will be in direct competition with these eastern producers. The highly competitive field, of course, is the East, but the situation there has had a far-reaching effect on market conditions all over the continent and in the field which the interior of British Columbia might regard as its logical sales territory the outlook for the immediate future is rather hazy. All this, however, cannot be regarded as other than temporary and it is inevitable that within a comparatively short period the balance will be righted again and the interior of British Columbia will step into its rightful place in the industry.

What can be expected when that time arrives? How is the interior of British Columbia equipped to meet the demands of that new era? It is probable that development of the pulpwood stands of the interior will follow in a general way the trend of settlement. That is to

Kraft Pulp Mill, Union Bag & Paper
Power Corporation, Tacoma, Wash.



Union Bag Factory at Columbia River
Paper Mills, Vancouver, Wash.



And now the Pacific Northwest!

HORACE GREELEY'S counsel was a long time reaching us, but we have yielded to it at last. The richness of Washington timber . . . the facilities for both rail and water transportation . . . the growing importance of West Coast and Mountain markets—this combination is too vital to be any longer ignored by a national organization!

So, at *Tacoma, Washington*—on the tide-flats, adjoining the plant of St. Paul & Tacoma Lumber Company—we are now opening the latest thing in Union Kraft Pulp Mills. The product of this unit is Northern Kraft Pulp in every sense of the words . . . especially developed for the making of serviceable bag-paper.

And, at *Vancouver, Washington*—on the northern bank of the Columbia River, opposite Portland, Oregon—we are now opening a full-fledged, modern Union Bag Factory. The material, made of Union Tacoma Pulp, will be supplied by Columbia River Paper Mills, on whose premises the Factory is erected. Perfect rail facilities . . . deep-water dockage at the door.

In addition to the regular Union Grades of Grocery Bags, the Vancouver Plant will turn out a general range of Odd, Special & Fancy Bags, including the Union variety of plain and fancy printing . . . and the arrangement includes a resident West Coast sales manager, sales-force, and the customary system of warehouses for the territory.

Wholesale Merchants in the Pacific Coast and Mountain States will now secure Union Paper Bags at a new and gratifying level of values . . . and with a new promptness.



UNION BAG & PAPER CORPORATION

Manufacturers of Wrapping Paper, Paper Bags & Paper Sacks
GENERAL OFFICES • WOOLWORTH BUILDING • NEW YORK, N. Y.

NORTH, East, South and West—every section of our country is a "home stand" as far as Union Paper Bags are concerned.



Spruce and cedar in interior British Columbia

say, pulp and paper mills will probably be located in sections which have already been established as producers in other associated lines of production, such as lumbering.

It would follow then that pulp production would probably become a reality along the Fraser River, which since the beginning of history in British Columbia has been a vital factor in colonization of a vast area. The long navigable stretches of the Fraser and its tributary rivers, too, would be an added advantage, and this condition applies even as far north as Prince George, which by the way seems ideally situated for a large pulp and paper mill because of the large number of "feeders" radiating from that point.

Assembly of pulpwood from an extensive area at Prince George would be an exceedingly simple and inexpensive matter and that is one of the chief con-

siderations on which the promoters of a large mill there have based their plans.

The area drained by the Thompson River would be similarly affected and here, as on the Fraser's arteries, the availability of waterpower would be a valuable aid. On the Thompson as well as on the Fraser the advance of settlement has brought lumber mills and related industries, and provision of a good market for pulpwood through the establishment of mills would follow as a logical successor and ally to the lumber business.

Large Timber Area

Roughly speaking, good pulping timber is to be found throughout the interior section of British Columbia from the international boundary line northward, although there are wide stretches where its cutting would not be warranted due to thinness of the stand, lack of waterpower and transport facilities. Engelmann and white spruce are the more important species from a pulp standpoint, but balsam fir, western hemlock, and lodgepole pine produce a satisfactory paper. The spruces are found throughout the interior of the province and extend north into the Liard Valley and beyond the northern boundary of the province. Of the estimated 59 billion feet of spruce east of the coast ranges 56 billion is of these two species. Stands are not so heavy as on the Coast, 10,000 board feet to 25,000 board feet to the acre being good yields, but the percentage of spruce runs much higher, being 60 to 80 per cent in most cases. The spruce resources of this vast interior strip have as yet been exploited to only a very limited extent, but are being used for lumber production in Cranbrook and along the upper Fraser. In the southern portion of the interior Engelmann spruce forms the important part of the forests at altitudes between 3,500 and 5,000 feet, and in the northern portion of this range it occurs between 1,000 and 4,000 feet elevation. As a rule, it occurs in mixed stands, with alpine fir or lodgepole pine, but frequently it is found in almost pure stands. In dense stands it produces long, clear trunks with very little taper.

Spruce is the chief wood used in pulp making in Canada, and the fact that the Commission of Conservation estimates there to be nearly 60,000,000,000 feet of spruce in the interior as compared with only about 15,000,000,000 feet on the Coast gives weight to the prophecy made in some quarters that the interior will soon rank on equal terms with the Coast as a producer of pulp. The provincial government intends that this vast heritage of pulpwood timber shall be adequately husbanded for the future, and several extensive areas have been set aside as forest reserves in which logging

ESTIMATED AMOUNT OF TIMBER BY SPECIES AND REGIONS INTERIOR OF BRITISH COLUMBIA

(In thousand feet, board measure)

Species	South of Railway Belt	Railway Belt	South- Central	North- Central	East of Rocky Mts.	North- ern B. C.	Total
Douglas fir	3,999,676	2,190,540	5,541,190	841,272			12,572,678
Western red cedar	4,391,748	2,179,080	10,121,304	1,327,292			18,019,424
Western hemlock	2,422,456	1,438,590	2,888,344	4,053,128		1,361,280	12,163,798
Balsam	1,300,264	472,280	4,206,442	7,195,936	331,260	332,000	13,838,182
Spruce	5,192,790	2,834,970	19,095,266	21,742,819	8,741,600	1,290,160	58,898,605
Western white pine	1,030,546	272,604	313,355				1,616,505
Western yellow pine	2,525,688	1,215,420	466,816				4,207,924
Lodgepole pine	1,953,744	731,696	3,379,643	2,647,849	2,932,300	148,240	11,793,472
Western larch	3,145,968	5,820					3,151,788
Cottonwood				101,404	77,840	93,120	272,364
Total	25,962,880	11,341,000	46,013,360	37,909,700	12,083,000	3,224,800	136,534,740

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What you really buy is performance. Consider price as only one factor in cost—your actual cost is price divided by service.

A. P. Green refractories merit your serious consideration on the basis of direct measurable economy—"They Last Longer"! Their ability to give longer, and sustained service at lower cost is definitely known wherever fire brick service records are kept.

We shall appreciate the opportunity to present facts showing the possibilities of A. P. Green refractories—EMPIRE, KRUZITE, MIZZOU, BIG CHIEF—from the standpoint of lowering fire brick costs in your plant. Our engineers will be glad to consult with you in determining the correct refractories for your furnaces. Our line is complete. Write for a catalog and data.

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Furnace Arch and Wall Construction

DETROIT, MICHIGAN

*Bigelow Suspended Walls
Liptak Type X Walls
Liptak Type S Walls*

*Bigelow Suspended Arches
Liptak Single Suspension Arches
Liptak Double Suspension Arches*

The combination of the BIGELOW-LIPTAK SUSPENDED WALL and the BIGELOW-LIPTAK Suspended Arch makes possible the construction of large units of special design, often without resorting to the use of expensive special parts and elaborate supporting structures. The method of unit construction relieves the refractory material of all load, as well as of the stresses of expansion and contraction, and enables repairs to be easily and quickly made without the need for cooling the furnace.

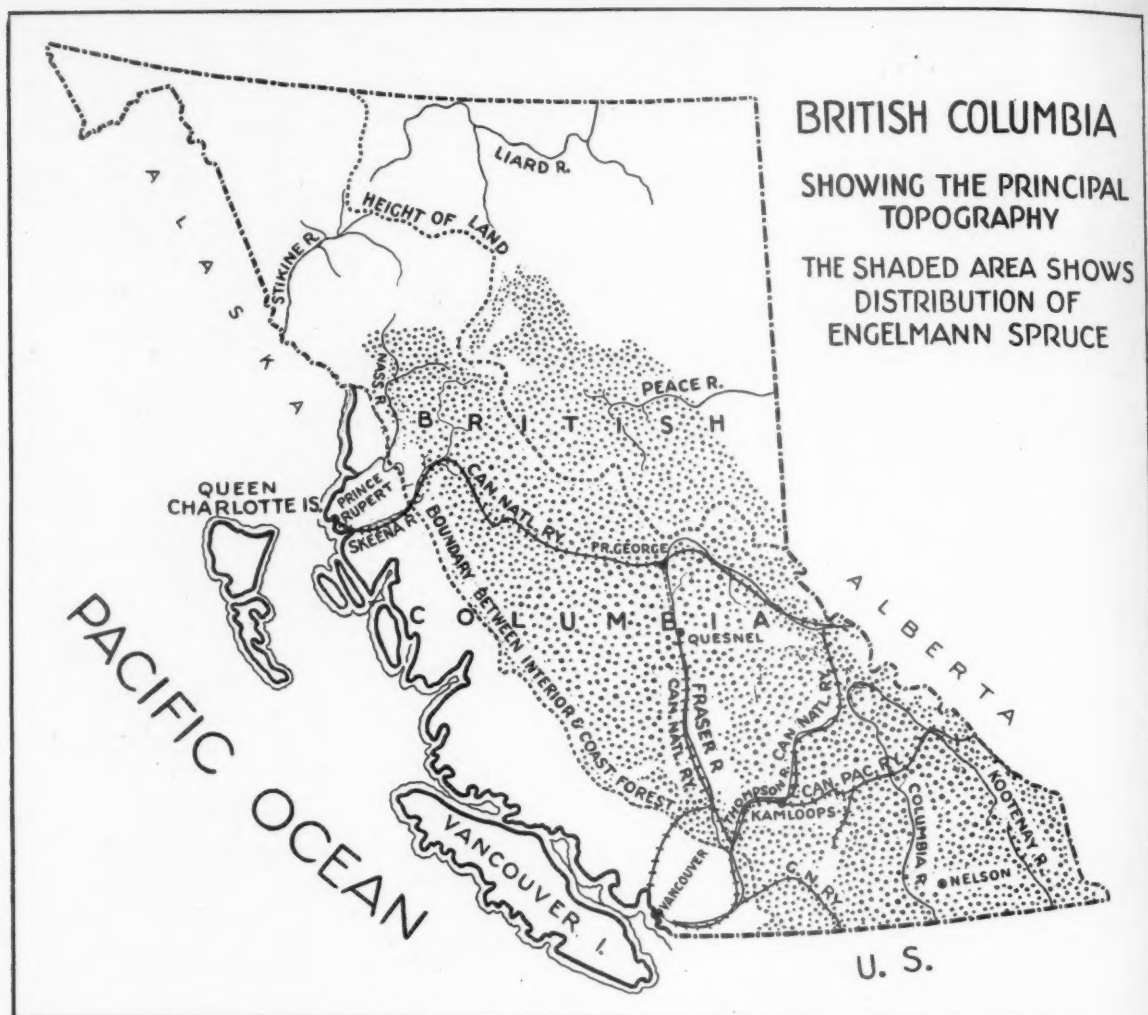
Represented in the Northwest by

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operations will be carried on only according to scientific formula so as to reduce waste to a minimum and provide for perpetual supply. With the same object in view, the government is making a thorough survey of the entire timber resources of the province, so as to eliminate, as far as possible, waste and convert into merchantable products materials now unsuited for saw-mill purposes.

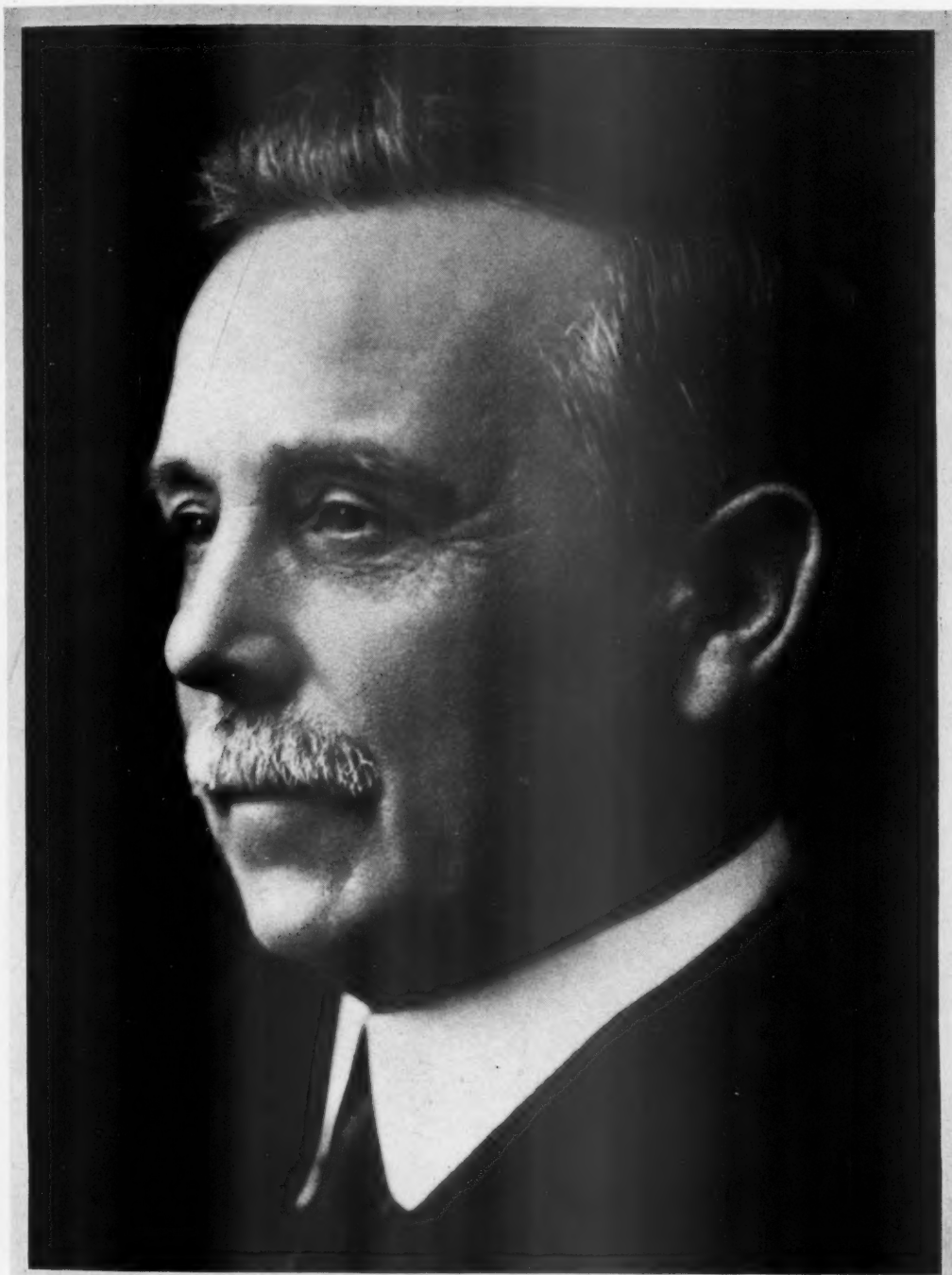
Of the 294,058 square miles of terrain in the interior of the province, 115,533 square miles, or 39 per cent, is above cold timber line and has too severe a climate to produce merchantable timber. For that portion of the interior lying within the so-called railway belt and to the south of it, the merchantable timber line is estimated to be about the 6,000 feet contour line. As we proceed north the elevation at which timber will grow gradually becomes lower, and for the northern interior of the province cold timber line is reached at from 1,500 to 3,500 feet. While temperature conditions are favorable to forest growth on 178,525 square miles of terrain in the interior, a portion of this area is considered incapable of bearing merchantable timber due mainly to soil and other climatic conditions. In the first place, there is an area, situated mostly within the "dry belt", where the moisture conditions are unfavorable, which is mostly covered with grass, sage-

brush or very open timber. Nevertheless it has been estimated by the Commission of Conservation that of the 135,815 miles of land in the interior that is capable of bearing merchantable timber, only about 30 per cent is carrying timber of merchantable size at the present time. That is not as dark a picture as it would appear, however, for most of the loss has been due to fire and very extensive areas are re-stocking with forest growth, the greater percentage being of species which will in future be used for pulpwood. In many cases (Turn to page 132)

ESTIMATE OF TIMBER IN THE INTERIOR OF BRITISH COLUMBIA (In thousand feet, board measure)

Region	Stand of 10 M or over per acre.	Stand class between 5 M. and 10 M. per acre.	Stand class between 1 M. and 5 M. per acre.	Total
South of Railway Belt	6,360,600	10,798,800	8,803,480	25,962,880
Railway Belt	5,036,800	3,382,800	2,921,400	11,341,000
South-Central	10,824,760	22,469,800	12,718,800	46,013,360
North-Central	2,831,600	21,442,800	13,635,300	37,909,700
East of Rocky Mts.	1,921,000	7,201,200	2,960,800	12,083,000
Northern B. C.	268,800	1,665,600	1,290,400	3,224,800
Total	27,243,560	66,961,000	42,330,180	136,534,740

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Supplement to Pacific Pulp & Paper Industry

WILLIAM HOWARTH
President, Everett Pulp & Paper Co.



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The Pacific Northwest's First Paper Mill

That early day mill which began production in 1866 at Oregon City was the forerunner of greater things.

An Interview With J. W. P. McFALL

THE first paper mill in the Pacific Northwest was established in 1866 by W. W. Buck at Oregon City, Oregon. With Mr. Buck were associated Arthur Warner and Thomas Charman, natives of England. Of the last two men little is recalled. It is believed that Mr. Buck early acquired his partners' interest, although the historian was unable to establish this as a fact.

Mr. Buck, a native of Ohio, accompanied by Mrs. Buck, came to Oregon by ox team in 1845. They spent their first winter in a floorless log cabin on the outskirts of what is now Portland. Early in 1846 they moved to Oregon City, where Mr. Buck, who was a mechanic, found work. From the first he took an active part in the affairs of the village, which boasted a population of 500. As time passed he acquired various holdings, including a sawmill.

Alert to the demands of the growing town, already being served by a newspaper, Mr. Buck conceived the idea of building a paper mill. Whether the venture was publicly or privately financed is not recalled; however, it is known that the capital stock was \$50,000. Construction on the building was started in the spring of 1866, and the mill set in operation late that fall.

Paper Describes Mill

"The building for the pioneer paper mill of Oregon is now completed and the machinery well advanced preparatory to active operations," we read in a paper on the subject printed in October, 1866. "It will in every particular be a first-class establishment. The capital stock of the company is \$50,000. The present machinery includes a full set of modern cylinder description, with a capacity in turn of 1500 pounds of paper per day. Of operatives the mill will employ about 20 men and women. The building is of brick and stone, four stories high, 30 by 60 feet, with an addition, 17 by 60 feet, two stories high. This space is divided into rooms adapted for the work of making paper.

"When the stock is first received it is weighed and then hoisted to the fourth story of the main building. Here it is stored in the stockroom. As it is wanted it is passed down through an opening to the third story or sorting room, where the process of sorting the material for each particular kind of paper is gone through with. The rags as sorted are placed in proper bins. It next passes to the second story, where it is subjected to a process of cutting and dusting, thence it passes into the first story where it is cooked before being put

into beaters where it is bleached and ground into pulp. "The pulp now passes into 'stuff chests', from whence it is pumped up to the paper machines, where the nicest process is performed. After leaving the 'stuff chests'



WILLIAM LEWTHWAITE

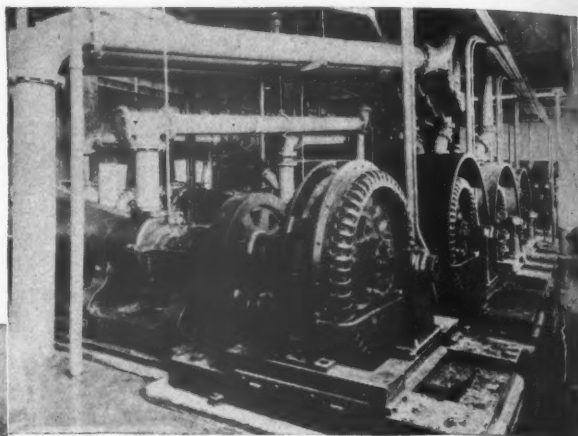
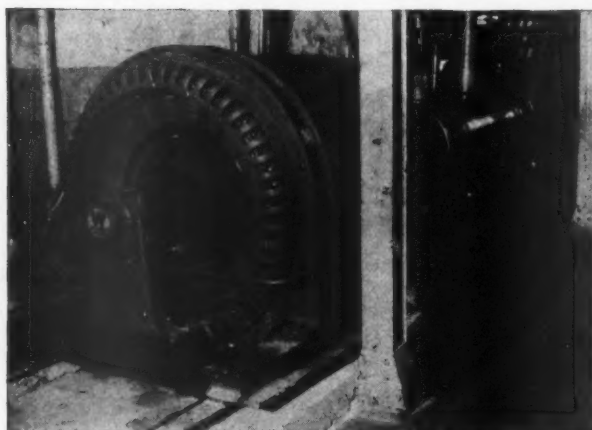
Mr. Lewthwaite was the first paper mill superintendent in the Pacific Northwest. Born on the Isle of Man in 1838 he came to America in a sailing ship in 1858. The name of Lewthwaite today is met with frequently in the Pacific Coast pulp and paper industry.

the pulp passes into a vat, where it forms into a sheet on a wire cylinder, the water being all extracted by a fan wheel and turned back to another section of the vat to pass through the same process over and over again, leaving the pulp to adhere to the filling machine as it moves along on through the first press rolls.

(Turn to page 100)

HR SYNCHRONOUS MOTORS

150 hp. HR Synchronous Motor Driving Appleton Jordan, Thilmany Pulp & Paper Co., Kaukauna, Wis.



Four 350 hp. HR Synchronous Motors Driving E. D. Jones Jordan, National Paper Products Co., Division Crown Zellerbach Corporation, Port Townsend, Washington.

for any size of any Jordan

THERE is an HR Synchronous Jordan Motor with the proper characteristics to drive any Jordan. Such a complete line of Westinghouse Jordan Motors makes available to mill operators the numerous advantages of the synchronous motor for this drive.

The cost of power is a minimum because these motors have a high inherent efficiency even at the relatively low speeds required.

The power factor of the entire mill can be improved by using synchronous motors which compensate for the low power factor of the many small induction motors used.

Westinghouse HR Synchronous Jordan Motors are of fabricated steel construction with heavy pedestal type bearings of the same design as that used for the heaviest duty applications; consequently, these motors are strong and rigid, open and accessible, and take, in some instances, even less space than motors of other types with equal rating.

Westinghouse Electric & Manufacturing Company
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Durable Drives for Jordan Engines

THE Jordan engine drive is the most strenuous drive in a paper mill.

Service is continuous, and the driving gears are constantly subjected to severe shocks and sudden overloads.

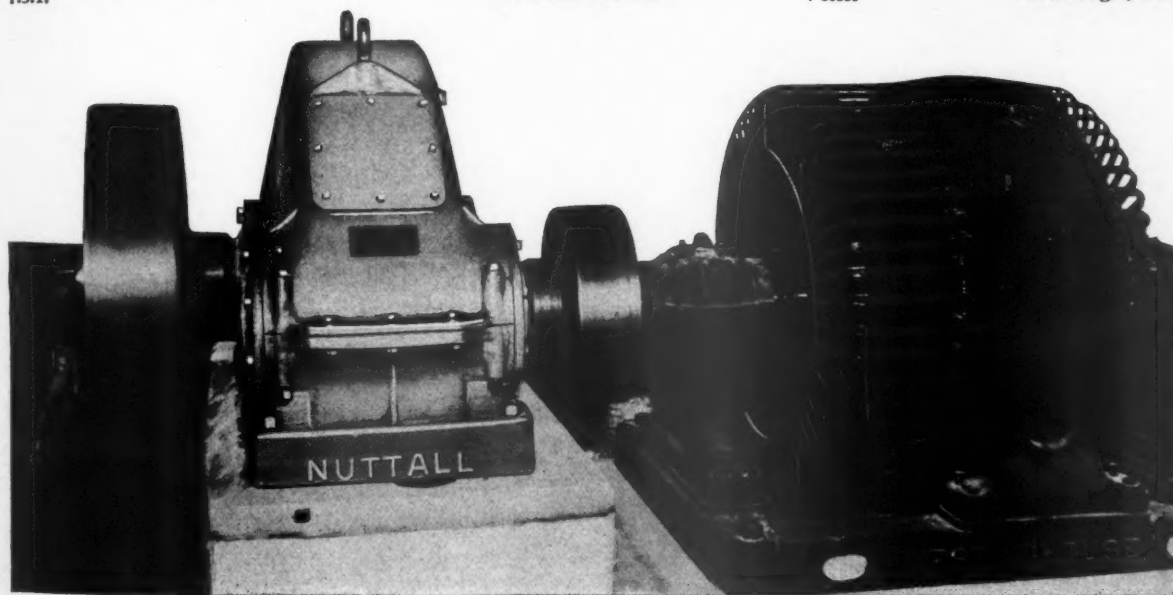


Westinghouse-Nuttall mill units are built to meet just such exacting service and to do it efficiently and dependably over a long period of time without any attention except occasional oiling.

Single helical gears with their universally accepted advantage, the benefits of Timken bearings, a sturdy, oil-tight, dirt-proof case and a positive lubricating system are distinctive features which eminently qualify Westinghouse-Nuttall units for the heavy duty drives of paper mill operation.

A Westinghouse-Nuttall single-reduction unit on a Jordan engine drive transmitting 400 hp. at 900 rpm. with a ratio of 7.5:1.

Westinghouse Electric & Manufacturing Company
Nuttall Works T 30389 Pittsburgh, Pa.



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First Northwest Paper Mill

(Continued from page 97)

"At this point the sheet is practically sufficient in itself to bear its own weight, and it passes on through the second press rolls next to the drying cylinder, thence through the calendars, next on the reels and finally to the cutters, where the paper is laid off in sheets and taken to the finishing room to be counted, folded, pressed, bundled and sacked to be sent to market.

"Taken throughout, the work of making paper is of rare interest. W. W. Buck and the architect and millwright, A. M. Hardin, are an honor to the enterprise of the projectors. There is a great demand for materials, by which the mill may be kept in active operation when once under way.

"The market for paper on this coast for the past ten years has been poorly supplied; most kinds have been high. The two mills of California at Taylorville and Santa Cruz, have been but a drop in the bucket as it were, as, while they have been constantly employed, prices of paper still gradually advance, with a very scant supply. In 1865 the pioneer mill of Taylorville manufactured 5820 reams of news and 6840 reams of wrappings. They are doing even better than that during the present year, and yet they are unable to fill their orders. We have no report from Santa Cruz mill, but no doubt they are doing equally as well."

Town Celebrates Opening

At the time the mill was established the town had a population of about 1200. An entire day was given over to dedicating the new enterprise. Music by the city's brass band and a public ball were features. Not only did the new industry mean jobs for a score of local men and women, but it also meant employment for many wanting to make pin money. Besides rags, the management announced they would buy old newspapers, old rope, discarded sails from ships, salmon nets and straw. Although the mill's output was only three-quarters of a ton daily, this meant real effort to collect sufficient raw material.

In spite of seemingly bright prospects, the new industry proved short-lived. Shortly after starting the machinery began to give no end of trouble. Mr. Buck is said to have spent much of his time tinkering with the equipment. Becoming discouraged he offered \$2,500 to anyone who could correctly adjust and regulate the various units. No one took the offer. Rags grew increasingly scarce, although good prices were offered; and a bank pushed its claim of \$10,040. With everything conspiring against him, Mr. Buck was forced to close down in less than one year. To satisfy its claim the bank ordered the sheriff to sell the mill's assets. Thus passed the beginning of an industry which, within a stone's throw of the old site, has grown by leaps and bounds.

Mr. Buck Tries Again

Mr. Buck's connection with the paper mill industry, however, did not end here. Indeed, it would seem that he saw the handwriting on the wall while operation difficulties were besetting him. For, according to seemingly authentic records, we find that he, together with his son, H. S. Buck and H. L. Pittock, then publisher of a Portland newspaper, formed a separate company sometime previous to the crash. The new concern, known as H. L. Pittock & Co., lost little time after the first mill's failure in establishing a second plant.

This they built at Park Place, about a half mile northeast of the old site. Timber for the frame-constructed building was cut by Mr. Buck's sawmill, located near the saw mill site. Modern machinery, including a 56-inch paper machine, was ordered from Worcester, Massachusetts.

Meanwhile, the promoters were determined to avoid the pitfall made by Mr. Buck in the first venture—that of trying to run a mill without the aid of an engineer. Accordingly, they scoured the country for a man who would fit their needs. The man who most appealed to them was William Lewthwaite, then superintendent of the Taylor Paper Co., Taylorville, California. Sufficient inducement being offered Mr. Lewthwaite resigned his position and moved to Oregon City sometime during 1868. He supervised the installation of the mill's equipment and was the mill's first superintendent. William Lewthwaite, who came from a family of papermakers, was the ancestor of several other Lewthwaites of the Pacific Coast's pulp and paper industry of today.

Previous to the mill's opening, announcement was made that every grade of paper "from strawboard to cream laid note paper" would be manufactured. Some delay was experienced in getting under way, as a result of which paper shortage in Oregon City became acute. A local newspaper is said to have virtually suspended publication because of insufficient newsprint.

Sometime after the mill started production in 1868, Mr. Pittock acquired Mr. Buck's interest. The name of the concern was changed in the late 70's to Clackamas Paper Mills, and an agency established in Portland. In 1879 the name of the mill was again changed, the business being known thereafter as the Clackamas Paper Co. An advertisement appearing in a Portland city directory in 1881 sets forth that the paper company manufactured "news, manila, rag, straw, wrapping and carpet papers." The plant was kept running seven days a week and but two shifts of men employed, the day shift consisting of 13 hours, and the night shift 11 hours.

Mill Moved to La Camas

Operation of the mill at Park Place continued until about 1884, when decision was reached to move the plant to what was then called La Camas, Washington. This town, about 30 miles northeast of Park Place, was the Camas of today. The original name was a corruption of Lackamas, the name of the stream passing through the townsite. The new location appeared a logical one, in that an abundance of cottonwood grew within easy hauling distance. At that stage of the pulp and paper industry in the Pacific Northwest cottonwood was considered the best pulp material available.

Coincident with removal of the industry, a new company—The Columbia River Paper Mills—was formed, with J. K. Gill, veteran Portland bookseller, as president. Mr. Pittock retained a substantial interest in the concern. Several months after the mill was established, the plant was almost totally destroyed by fire. The mill was later rebuilt, but did not prove a successful venture. After being closed down for a time, F. W. Leadbetter, now head of the Leadbetter interests, leased and reopened the mill in 1897. Under his guiding genius the business grew. Several years ago he sold his interests at Camas to what is now the Crown Willamette Paper Co. The Camas mill today is one of the largest and most complete in the country.

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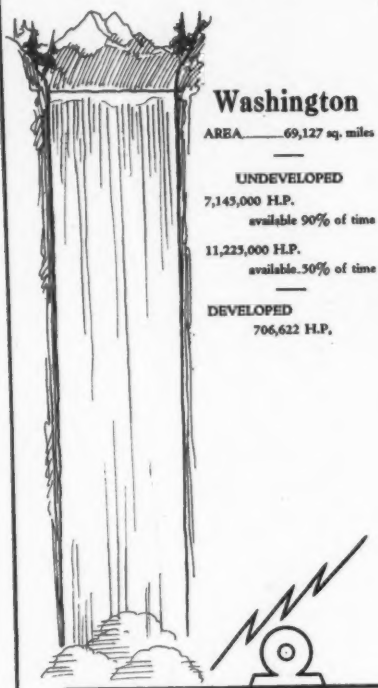
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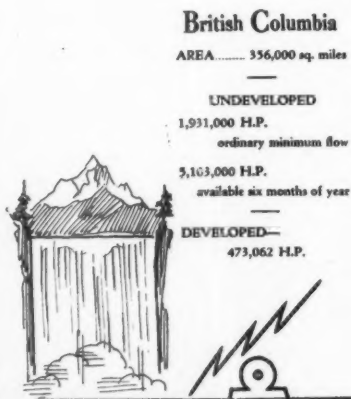
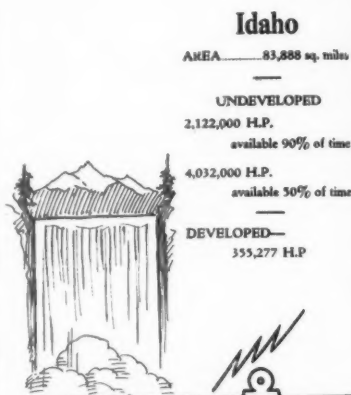
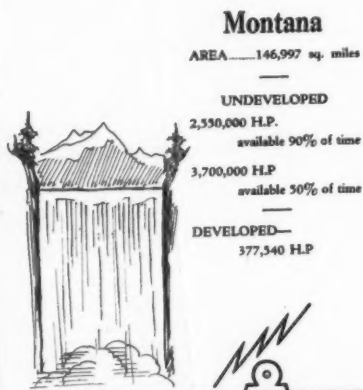
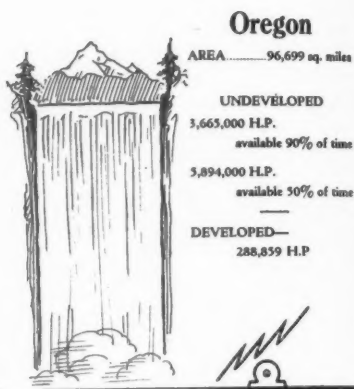
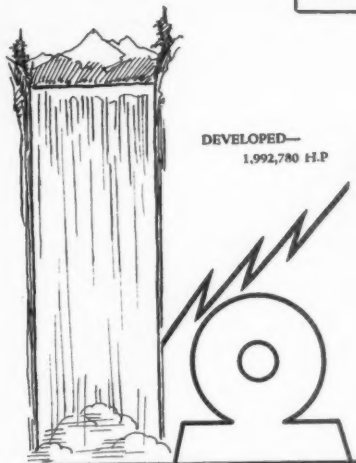


WATER POWER

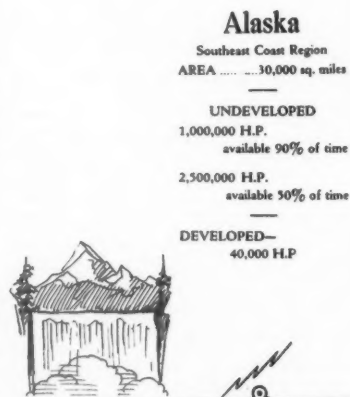
This graph shows the developed and potential water power resources of the five Western States, British Columbia and Alaska where the chief stands of pulpwood are concentrated. Undeveloped water power is represented by the waterfall while the symbolic electric generator indicates the developed water power measured in terms of installed capacity. The graph holds to true proportions and only the one scale is used. The five states shown include within their borders approximately 53% of the total undeveloped water power in the United States. Data as of January 1, 1928.

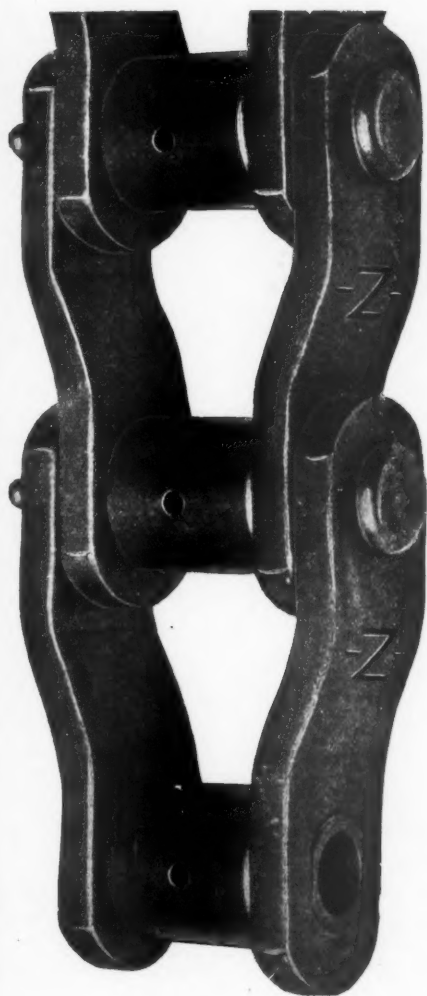


California
 AREA.....158,297 sq. miles
 —
 UNDEVELOPED
 4,603,000 H.P.
 available 90% of time
 6,674,000 H.P.
 available 50% of time



The three Pacific Coast states of Washington, California and Oregon, in the order named, lead the nation in water power resources with 40% of the total within their borders. The mountain states group, which includes Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah and Nevada, ranks second as a group with approximately 27% of the United States potential total. British Columbia has approximately 15% of the total water power resources of Canada.





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Water Power ---

The Pacific Coast Has 23,000,000 Wild Horses Waiting for Hydraulic Engineers to Harness Them

POWER is an essential in pulp and paper manufacture. Particularly is this true in the production of news print or other commodities where ground-wood or mechanical pulp plays a large part. The demand is for cheap power and lots of it. Hydro-electric development is often the best means to that end. Richly endowed with timber and water power, the Pacific Coast holds through the coincidence of these two manufacturing essentials a prepossessing advantage over some other regions for the building of a pulp and paper industry. What has been evidenced in the way of growth of the industry on the Pacific Coast in the past few years is perhaps but the forerunner of greater things to come.

Statistics compiled by the United States Geological Survey show that 53.27 per cent of the undeveloped water power of the United States, available 50 per cent of the time, is situated in the five states of Washington, California, Oregon, Idaho and Montana. Based on availability 90 per cent of the time these same states claim 52.67 per cent of the United States total.

Charts prepared by the Department of Interior of Canada show the province of British Columbia as possessing 15 per cent of the undeveloped water power of Canada, based on six months flow and comparable to the United States 50 per cent availability figure.

Public utility systems and private corporations have not been slow in developing the water power of the Pacific Coast, particularly in the states of California, Oregon, and Washington. A survey of hydro-electric plants shows that at present there is plenty of developed power to furnish a continued flow of electrical energy for established industries, with reserve units capable of taking care of normal expansion. Hydro-

electric production has shown a steady healthy upward trend and, at present, with plants in the three states showing on January 1, 1928, a peak load capacity of 2,998,261 h. p., only about 5 per cent of the power resources have been utilized.

Three factors playing important roles in the development of water power are (a) land topography, (b) facilities for storage of seasonal precipitation to assure a continued flow during the dry months, and (c) precipitation.

Practically the whole Pacific Coast is of a rugged, mountainous nature. Mountain ranges varying from 3,500 to 8,000 feet in elevation extend from Alaska through California. In addition to the ranges numerous mountain peaks dot the Coast, rearing up to 15,000 feet, and with Mt. McKinley in Alaska soaring to 20,300 feet above sea level, crowning them all. During the heavy winter precipitation periods rainfall is congealed on the higher levels in the form of snow fields and glacier ice. In the summer months, when the rainfall is at its minimum, the partial melting of these glaciers and snow-fields provides a well sustained summer flow, thus assuring a continuous supply of water for power purposes.

From a study of the chart on the following page it is seen that there is on the Coast a great variation in precipitation in localities and by seasons. Winds, altitudes and ocean currents are all contributing factors to these variations. However, the stream flow is kept fairly uniform by the heavier precipitation in the mountain altitudes. Also the natural storage provided by lakes, forests, snowfields, and glaciers withholds a considerable part of the heavy winter precipitation and releases it during the dry summer months, thereby augmenting the extremely low summer flow that would



SNOQUALMIE FALLS
in Western Washington

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occur if such agencies were not effective. Thus a large percentage of the annual precipitation can be utilized beneficially by power plants and the fact that the average rainfall in practically all the Coast areas is heavy adds considerably to the importance of this factor.

Investigation by the United States Geological Survey indicates that the Columbia river, exclusive of tribu-

streams are ideally situated for obtaining artificial storage and for diversion from one watershed to another the possibilities of future development are substantially Greater than represented by present statistics.

The 1928 report of the Dominion Water Power and Reclamation Service shows a present development in British Columbia, principally in the Vancouver, Victoria and Nelson districts of 473,062 h.p. Of this amount 81,000 h.p. is being developed for pulp and paper mills.

Vancouver Island Resources

Vancouver Island, rich in pulpwood resources has undeveloped water power opportunities estimated at 400,000 h.p. This figure and others given below for British Columbia represent maximum use and are comparable to U. S. estimate for 50 per cent of the time availability. Numerous rivers offer power for plants but the principal opportunities for major developments are on the Campbell, Nimpkish, Kokish, Marble, Gold, Cascade and Nanaimo rivers. Strong companies are already projecting paper mill developments on the first two named. Along the British Columbia Coast the rivers include the Nas with 605,000 h.p.; Skeena, 70,000 h.p.; Bulkley, 112,000 h.p.; Homathko, 137,000 h.p., and many lesser streams. This country is in the heart of the pulp timber belt. The Fraser river and its tributaries afford power opportunities estimated from 600,000 h.p. to 1,600,000 h.p., while the Columbia and its tributaries in Canada show a possibility of from 520,000 h.p. to 1,250,000 h.p.

Water power development in Southeastern Alaska to date has not been large. The present development of 40,000 h.p. embraces small lighting plants and power developments for Juneau, Sitka, and Skagway. Preliminary power site surveys have been made in Alaska. A report prepared by the United States Forest Service shows a rough estimate of 1,000,000 h.p. available 90 per cent of the time and about 2,500,000 h.p. available 50 per cent of the time. Preliminary survey for two large newsprint mills, both of which will be large power users, are now being conducted in Alaska.

Editor's Note: Water power data for the United States and Alaska are from the Department of Interior, Geological Survey. Canadian data are from the Department of Interior, Dominion Water Power and Reclamation Service.



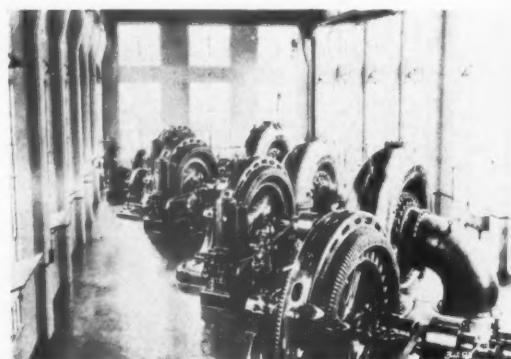
The Puget Sound Power & Light Co. has developed a number of power sites in Washington and their network of transmission lines covers an extensive portion of the state, serving a wide range of industries. Here is pictured one of their power houses on the Baker River.

taries, is capable of producing 4,795,000 h.p. 90 per cent of the time and 7,977,000 h.p. 50 per cent of the time. The latter figure is almost as large as the undeveloped power heretofore accredited to the entire State of Washington. Part of the power, however, is credited to Oregon because the lower Columbia river is the boundary between Washington and Oregon. On the Columbia river at Umatilla Rapids site there is an estimated 90 per cent of the time possibility of 341,000 h.p.; at the Dalles site 668,000 h.p. and the Grand Coulee site 644,000 h.p. With prevailing load factors a machinery capacity of nearly twice these figures would be warranted. Any one of these sites, developed, would provide more hydro-electric energy than is available in the majority of the states of the Union today. The above figures tabulated by the United States Geological Survey are considered conservative.

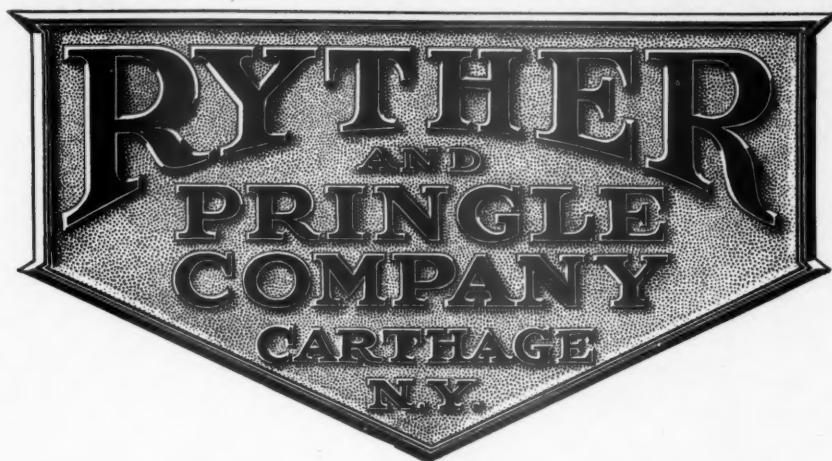
California Power Resources

California, on January 1, 1928, with 156 plants in operation had a rated capacity of 1,992,780 h.p. It is believed that the 1929 figures will place the California horsepower rating well over two millions. As the most recent surveys show 4,603,000 h.p. available 90 per cent of the time it is clear that California has far from exhausted her water power supply.

In the other Coast states, as in Washington, the water power resources have hardly been touched and in some sections even the potential water power has never been adequately surveyed. The estimate placed on available water power by the United States Geological Survey are very conservative and probably far below the actual figures that more complete surveys will disclose. Present figures are based largely on the unregulated flow of the rivers and as many of the



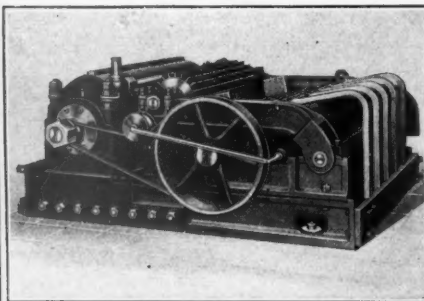
Some of the Pacific Coast's wild horses in electric harness. Hydro-electric installation of Pacific Mills, Ltd., furnishing power for the mill and townsite at Ocean Falls, B. C.



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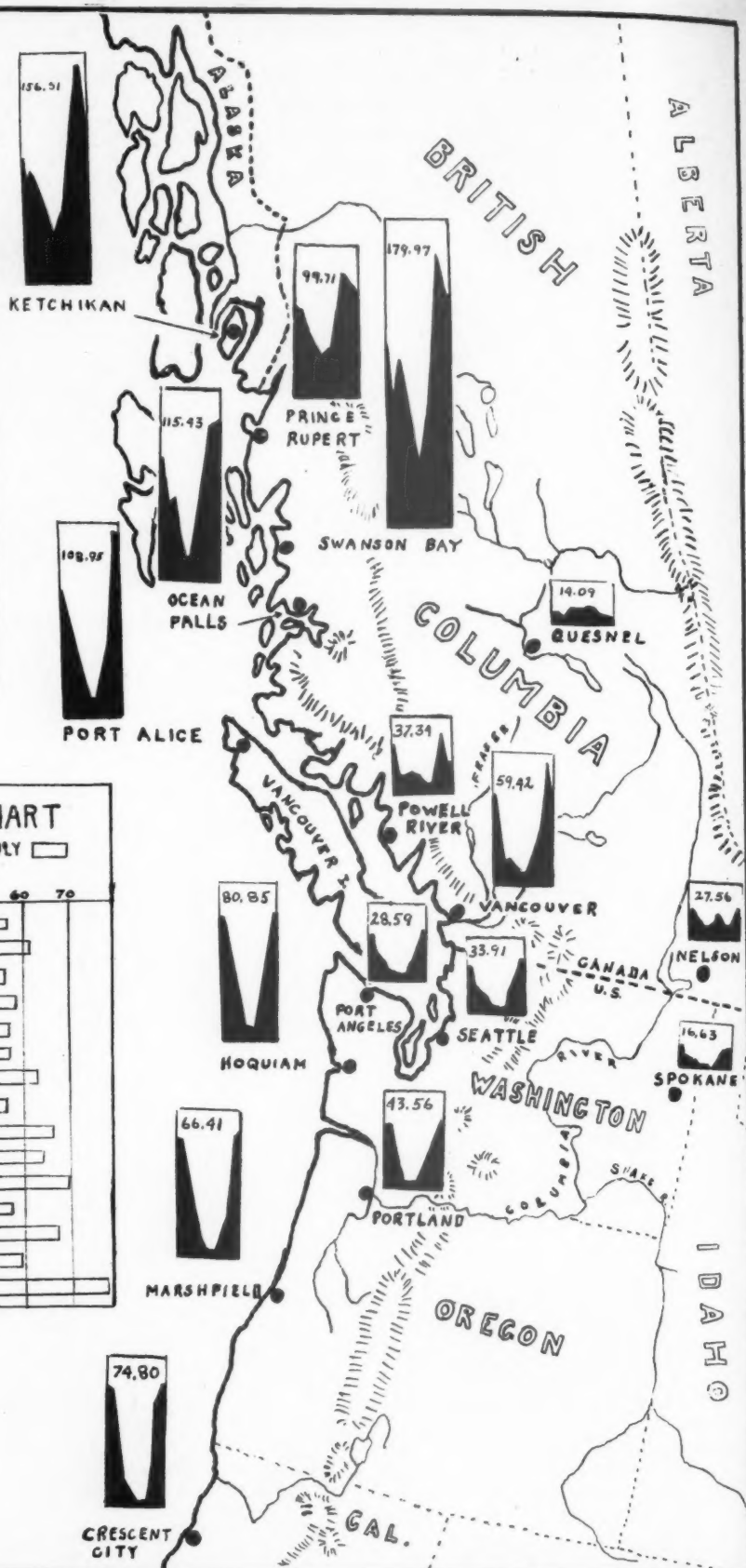
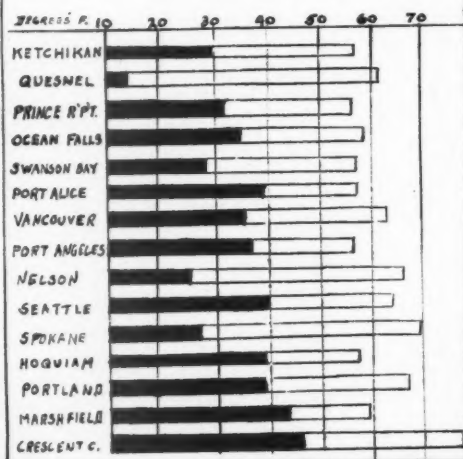
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WHAT THE CHART SHOWS

THIS chart shows the distribution of annual precipitation at characteristic points in the pulp wood regions of the Pacific Coast. Figures given in each of the small distribution graphs represent the average annual precipitation at that point as shown in official Canadian and United States records. In the temperature chart in the lower left corner the average mean temperatures for January and July at the different points are indicated. A study of the chart, comparing precipitation and temperature, will reveal the temperate nature of the climate and serve to explain the abundance of two basic resources of the Pacific Coast, namely, waterpower and timber.

TEMPERATURE CHART

MEAN JAN. ■ MEAN JULY □



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The Paper Industry

In the Lands of the Soviet

The Russians are setting a new and faster pace in these days of reconstruction and must be reckoned as a growing force that threatens to disturb the equilibrium of world markets.

By KING HAMILTON GRAYSON
Consulting Research Engineer

SOME two billion acres of virgin forests are behind the expansion of the Soviet paper and pulp industry, with mills ready to deliver 308,000 metric tons of paper, 56,000 metric tons of cardboard, 100,000 metric tons of cellulose*, 124,000 tons of wood pulp*, and 100,000 tons of sulphite* as the total output for 1928. There are four new mills under construction at present in addition to the 38,200,000 Rubles† expended this year (1928) for reconstruction and new equipment. And this output will be increased by 28 per cent in the next 12 months. The fact that the Soviets are still purchasing paper in foreign markets is taken by many to mean that their mills will not be ready for international competition for many years, but just as soon as the home saturation point has been reached, exporting of paper will follow. This has already started in a small way with 70 tons in 1926 and 146 tons in 1927 being shipped to foreign markets.

The old Russia could be counted upon as a regular customer for foreign papers, importing from Europe during 1910 a total amounting to 30,689,790 Rubles, and in 1911 a total amounting to 24,441,000 Rubles. In addition, Great Britain sold Russia paper amounting to 318,000 Rubles in 1910 and 378,000 Rubles in 1911. Finland, at that time, supplied paper amounting to 19,000,000 Rubles; and Germany, a total of 9,500,000 Rubles, during 1910. In turn, Russia sold England dry, bleached and unbleached wood pulp totaling 13,972 tons in 1911, and 18,799 tons in 1912, together with packing paper amounting to 12,090,200 pounds in 1910, 14,246,200 pounds in 1911, and 15,931,900 pounds in 1912.

Condition Unsatisfactory in 1911

Still, the condition of the Russian paper markets was regarded as very unsatisfactory in 1911, due to a great extent to a depressed financial situation in Siberia. The Finnish mills also captured the best business in the Polish markets with lower prices than could be met by the Russian mills. This forced two of the larger Polish mills to change their outputs and a large increase was made in tissues. However, the Viborg

*Mr. Grayson explains that in the Soviet technical classification both sulphate and soda pulps are included under the general term of "cellulose". "Wood pulp" as used in this article means "mechanical wood pulp"; "sulphite" is the same usage as current in America. Under the heading of "chemical pulp" the Soviets include sulphite, sulphate and soda.

†The value of the Ruble is based on \$516 which, Mr. Grayson explains, was the average value at the close of 1928 and which also was the pre-war average for many years.

district enjoyed a good increase in exports of paper and pulp, jumping from 2,000 tons in 1910 to 8,000 tons in 1911. It was a sort of give and take program and the Russian mills manufacturing sugar imported packing papers from Finland of a total of 3,710,000 Rubles.

No new mills were constructed in Russia during 1911 and one of the oldest companies was forced to close through financial difficulties. This seemed to speed up the industry in Finland with a result of export business amounting to 50,000,000 Finmarks in 1910 and a total of 58,300,000 Finmarks in 1911. On the other hand, the types of paper were limited and Finland imported its blotting, emery, coarse, writing and special papers from Great Britain. The exports of products from Finland is shown in Table I:

TABLE I.

	1911	1912
Mechanical Pulp	23,667 tons	20,360 tons
Chemical Pulp	32,408 tons	29,077 tons
Mill Boards	27,318 tons	23,864 tons
Paper	75,798 tons	69,686 tons

It is interesting to note that all shipments to America during those two periods were made through Germany, a condition which was changed by the War.

The manufacture of paper in Finland is one of the older industries, dating back to 1841 when the first paper-making and wood pulp machinery was introduced. There were ten mills established and operating at the beginning of the twentieth century, thus giving Finland considerable headstart over the industry in Russia. The growth of Finland's industry is best illustrated in Table II:

TABLE II.

Period	Number of Employees	Production in Finmarks
1885	2,058	9,024,400
1895	4,119	16,622,200
1905	9,117	40,924,200
1909	9,862	52,569,400
1910	10,904	61,224,900

PRODUCTION

Period	Pulp Tons	Cellulose Tons	Paper Tons
1885	16,458	383	16,201
1895	40,754	9,527	23,862
1905	113,816	29,599	70,484
1908	119,488	66,107	98,243

EXPORTS

Products	Tons—1909	Tons—1910	Tons—1911
Paper	79,463	106,899	123,400
Mill Boards	40,708	45,592	47,200
Mechanical Pulp	35,860	33,654	43,400
Chemical Pulp	35,609	50,223	67,100

All of the above was more or less inter-allied with Russia's paper and pulp industry and both Finland and

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Poland were then regarded as the seat of the business. Russia was both a buyer and a seller of paper, a condition which is true today, but which is rapidly changing.

The World War, followed by the civil strifes and invasions, left all of the industries of the Soviet Republic in a state of complete paralysis. Basic machinery worth billions of dollars had been destroyed, and in the majority of cases both the technical and working personnel had been scattered far and wide.



KING HAMILTON GRAYSON

Mr. Grayson writes from experience. He has collected a great deal of data on the pulp and paper industries of Scandinavia, Germany and Japan, and recently he spent considerable time in Russia and Siberia where he had opportunity to view the Soviet industry at first hand. With this background of international observation he is able to present an article of personal investigation. A graduate of Berlin University, Department of Research, he has traveled extensively and for the past eleven years has been a regular contributor to nationally known business journals.

The railroads were completely demoralized, the rolling stock was vastly depleted, 1,250 miles of roadbed had been swept out of existence, and 3,672 railway bridges with a total length of 48 miles were in ruins. On top of this, the currency of the country was absolutely worthless. Such was the picture presented to those who proposed to rebuild a nation and reconstruct the paper industry.

The first necessity was to restore the railways to a workable basis. Efforts were then concentrated to re-

habilitate the most vital industries. Paper was not included in this initial survey despite the fact that it offered tremendous possibilities both as a means for saving and one of income. However, the engineers of the nation decided that the outside world could better supply it at that time. In the autumn of 1921 industrial production stood at less than 15% of the 1913 output. That same necessity which is always the mother of invention, came to the rescue of the Soviets, and in September of 1925 industrial production had advanced to a point equal to 82% of the monthly rate of 1913. This remarkable recovery was effected wholly from within the new nation, without the aid of a single foreign loan.

The greater portion of the plants engaged in the paper industry of Russia before the War were located in that territory which was transferred to the border states in the adjustment period. However, during 1925, the paper industry was again organized under a system of nine producing trusts, conducting a total of 70 mills. From that moment the industry again became one of the major units of the industrial system. Ultimately, the paper and pulp mills in the limitless forests of Russia and Siberia will become the greatest competitor for the remainder of the world. Table III illustrates the growth of the industry since the reconstruction period.

The Soviets are still purchasing paper abroad and during their fiscal year of 1924-25 they imported 131,200 tons as compared with 43,400 tons in the previous year, and 157,400 tons during 1913. The imports for 1926-27 covering paper and cardboard reached a total of 103,300 tons, and those of 1925-26 were 141,300 tons. During 1925 the Japanese mills furnished paper for Russia amounting to 738,000 Yen (Yen equals \$.498 normal), and in the following year shipped a total of 746,000 Yen. Germany was the second largest foreign seller, followed in turn by Finland, Norway, Sweden, Czechoslovakia and Canada. The imports during 1927 were mostly newsprint, of which in rolls there were 61,656 tons and 7,787 tons of sheets. Finland supplied 46% of this amount, due to favorable credit and price conditions. Estonia was second with 22%, and Germany, Sweden and Norway covered the balance. Imports of foreign papers will decline markedly during 1929 and the succeeding years due to the tremendous expansion program of the Soviet mills.

Purchase American Machinery

One item of interest in this connection was the recent visit in the United States of the commissioners from the Central Paper Trust who came here to purchase paper mill machinery amounting to \$500,000. This will be installed in the new Balakhna mill on the Volga River, and will be the first paper-making equipment to be furnished by America. All previous equipment purchased here consisted of that for handling and transportation.

The Central Paper Trust Mills now produce 30% of the total cardboard and paper consumed in Russia,

TABLE III.

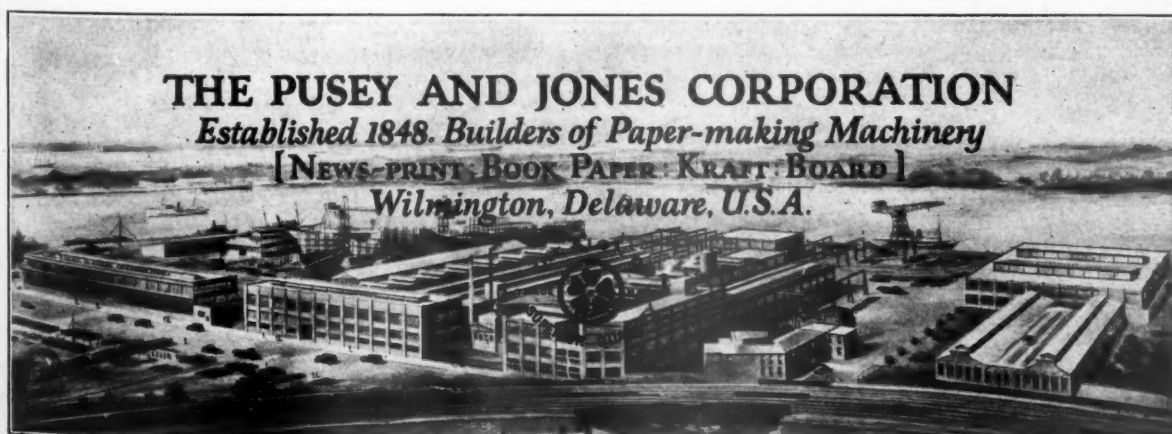
	1921-22	1922-23	1923-24	1924-5	1925-26	1926-27	1927-28
Number Factories	10	18	51	76	87	92	96
Number Machines	No Record	No Record	No Record	100	111	118	127
Average Number of Workers	No Record	No Record	No Record	26,000	29,900	34,000	36,400
Paper Tons	34,700	118,000	192,500	212,900	237,300	267,500	308,000
Cardboard Tons	2,600	12,400	17,700	20,200	26,300	39,000	56,000
Chemical Pulp Tons	11,200	35,500	49,900	54,600	68,400	75,600	100,000
Wood Pulp Tons	14,400	44,800	52,000	55,500	68,000	73,200	124,000
Rag, Semi-Pulp	None	None	None	12,100	12,600	19,900	21,500



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There is an international aspect to this view. An American-made tractor with trailers is taking out, under military guard through Northern Manchuria en route for loading for Japan, a load of Siberian pine logs cut on a Japanese timber-paper concession. In the group of men are Russians, Japanese soldiers and Chinese coolie laborers.

and 80% of the chemical pulp. Their Volga mills were started in 1926 and are now nearing completion. When ready, this mill will be among the largest in Europe and it will have the largest paper machine ever manufactured in Germany. When the American machine is installed their annual capacity will be 105,000 tons of newsprint paper. This is just an indication of the development that is taking place throughout the entire industry in Soviet lands. Twenty million dollars has been spent for new construction and equipment during 1928 and the production has been increased 8% over 1927. The completion of all mills now under construction will increase the output in 1929 not less than 28% over that of 1928. The four new mills known as the Balakhna on the Volga, the Kondopozh on Lake Onego, the Syas, near Leningrad, and the Balakhna cardboard mills will produce 93,000 tons of newsprint, 13,000 tons of wrapping paper, 13,500 tons of cardboard, and 50,000 tons of chemical pulp annually. The capital investment in these plants is already 65,000,000 Rubles, and the reconstruction investment at the Golodai, Okulovka and Sokol mills for new equipment this year has amounted to 16,700,000 Rubles. Through this reconstruction the output of the latter group will be increased by 52,000 tons of paper and 54,500 tons of pulp over the present capacity.

Education and Paper

In 1927 the paper production of the Soviet mills was distributed as follows: 31.3% wrapping, 22.2% writing, 12.2% printing, and 2.4% newsprint. The newsprint percentage increased in 1928 to 11.7%. The remaining percentage consisted of tissues, drafting papers, coated book stocks and lightweight cardboards. The present consumption of newsprint in all Soviet lands is 100,000 tons annually, but this is rapidly increasing, due to the tremendous educational program in force. This includes the publication of 559 newspapers, 27,000 poster newspapers and numerous crop sheets, with a daily circulation in excess of 8,000,000

copies. In addition there are now 1,292 magazines published in Russia with a circulation of 8,400,000 copies. In 1927 the 300 publishing organizations produced 225,000,000 books.

Advance Over Old Regime

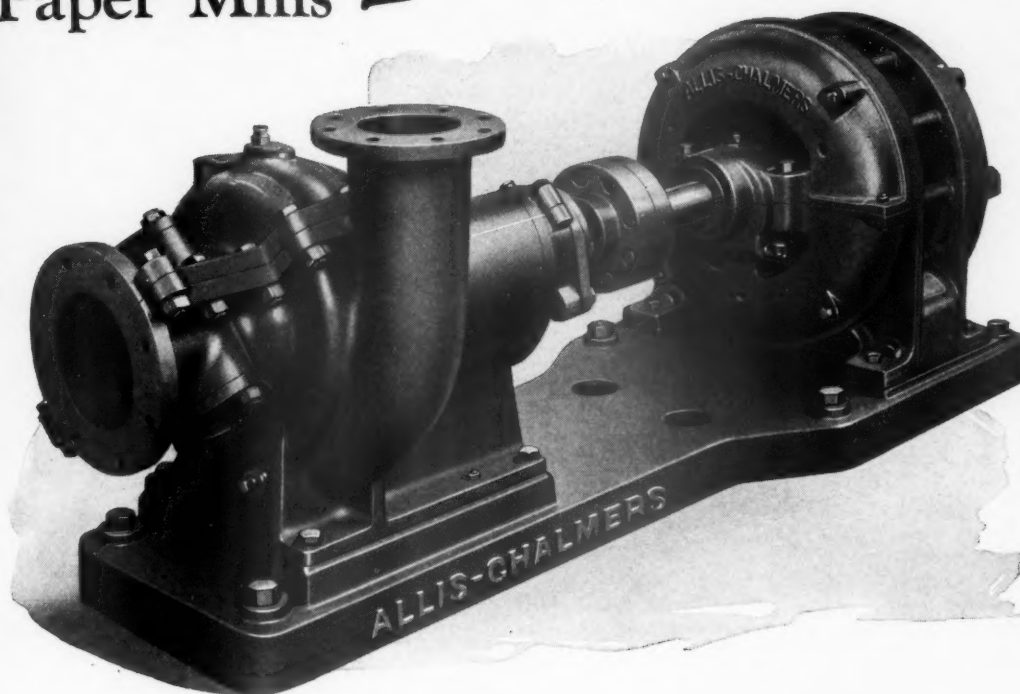
This represents a very gigantic advance over the conditions existing during the czar's regime, when 100,000,000 copies of books less were published and when the newspapers had a daily circulation of 2,500,700 copies. In 1913, due to illiteracy, there were only four peasant newspapers. The Soviets have improved conditions tremendously and today there are 146 peasant publications with a circulation of approximately 2,000,000 copies. So long as the Soviets purchase any paper abroad, American and Canadian mills on the Pacific Coast should be able to secure a portion of the business, providing they can meet the price and credit terms of the European mills. The Soviet demands for paper will not decrease, and now that their educational program is well under way, it will increase tremendously. Recognizing this factor, they have developed their newer mills, which are a credit to the industry, from an international point of analysis.

The new Volga mills cover a ground area of 281,000 cubic meters. In addition, they have constructed 118 workmen's dwellings containing 433 apartments. They are located in the heart of 1,000,000 acres of virgin forest, mostly pine, with convenient and very cheap river transportation. This plant, when complete, will have an investment of 32,000,000 Rubles. The new Kondopozh mills are equipped with German paper-making machinery and Swedish electrical machinery. The completion of these various units will put the Soviet industry into fifth place among the world's producers of paper.

As part of the still further expansion program there are nine Soviet engineers making a study of the Canadian mills at the present time. All of this has a direct

(Turn to page 134)

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Evaluation of Chemical Pulp and Cellulose

By DR. E. RICHTER, Chemist
British Columbia Pulp and Paper Co., Ltd.

WHEN testing chemical pulp of any kind—sulphite, sulphate or soda—the sample is formed into a sheet, dried and tested with mechanical instruments for bursting strength, tearing, folding or other qualities. All operations have to be done in exactly the same way every time and with exactly the same machinery, especially if the sample is beaten first to a certain extent.

There is no comparison possible if one mill uses an experimental beater, while others use an Abbe ball mill, a Dalen mill, a Lampen mill or a Geijer mill. Each machine gives its own characteristic curve for every type of pulp throughout the treatment or beating. First the strength develops with beating, then reaches a maximum and finally drops again. The accompanying graph shows four curves. Of course a multitude of others are possible, depending upon the kind of wood used, the method of cooking or other variables.

The pulp and paper industry has for a long time been searching for a universal yardstick which it might apply to any chemical pulp and make comparisons which would have but one common denominator and not be subject so much to the method of conducting the test. Dr. Richter has devoted considerable time in research on the subject of "Evaluation of Chemical Pulp and Cellulose" and in this article discusses his findings. The subject is one which has aroused much interest recently among pulp and paper technologists. Further, these technologists agree that it is of the utmost importance to pulp and paper manufacturers that standards be worked out for the evaluation of pulp.

Generally, it is not possible in routine testing, either in the paper mill, as the buyer of pulp, or in the pulp mill as the producer and seller, to make more than one determination on strength and freeness on a 10 or 15 ton lot. This routine test naturally has to subject the pulp to exactly the same degree of treatment every time, which means that we cannot consider a change in wood, method of cooking, etc. We register only one point of the curve and it is fixed by the number of revolutions, time of beating, or such other factors actually not connected in any way with the material with which we wish to get fully acquainted.

If we assume for instance that two hours beating time or 3000 revolutions correspond to our routine work, then curve No. 1 gives us 130 points strength and curve No. 2 gives us 110. The former seems the better, and yet No. 2 is in fact far superior as a paper making material. If we compare No. 3 and No. 4 there is no doubt that the paper maker would like No. 4 much better

But unless the whole curve is run a single test will not show the true properties.

The freeness test was thought to give a little more light on this subject, but it was found long ago that it failed to help. With freeness and strength test on hand we are still lacking some chemical test which would give us a survey at once of the qualities of any sample tested and which would allow even inexperienced men to form an idea about the raw material of the paper.

In studying the accompanying graph it will be readily understood that it would be sufficient for this purpose to know the upgrade part of those curves or such greater part of them, including the maximum. Of course, the machinery used for grinding or beating should be considered in the result although it was hoped that the Dalen, Lampen and Abbe mills would give about the same final value. The experimental beater, deviating somewhat in its work from the mills, consequently was expected to lead to other figures which, however, would be comparable.

The Copper Number

At one time it was thought that the copper number would develop into a physico-chemical test for the purpose just outlined. Prof. C. G. Schwalbe contributed a vast amount of work to the determination of the copper number, but he also found conclusively that it did not show any relation to the strength tests.

The copper number tests are generally done according to two methods: Schwalbe-Haeggund (S-H) and Schwalbe-Braidy (S-B). Both give different conventional figures and the tests according to either one of the methods are comparable only if done in exactly the same manner. The first one is very sensitive to time of action and also gives a fine precipitate which is hard to filter. The second one, as far as published, has a great drawback in its sampling method, but otherwise would be convenient for a routine test.

Since it has become more important to know the reducing qualities of pulp, especially with regard to rayon pulp, I am informed that on both continents committees are at work trying to establish a good standard method for the copper number determination. The writer, however, has always been of the opinion that the copper number is of great importance also to paper pulp, as many practical reactions are inexplicable, if the reducing quality is not known.

The results from this kind of test have been beneficial in every mill laboratory although it generally took some time to get well acquainted with them. The results were relative, as up to this time nobody has found an equation for the reducing action of pulp on alkaline copper solution. Personally I prefer the S-B method because it is less influenced by time, which is important in some cases. It is easier to filter the final solution

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efficiently, because the cuprous oxide is deposited in larger particles. (Dr. H. Wenzl u. Koeppel, Wochenbl. f. Papierf. Techn. & Chemie d.P. 1928 with Photomicrographs). The only objection that has to be overcome is the preparation of the sample, which according to the authors is done by rubbing the dry pulp over a grater and rejecting the screened off dust.

If we shake the pulp samples, dry or moist, with glass beads and 250, 100, 100 and 50 cc of water (500 cc total) in a suitable bottle, we get not only a well disintegrated pulp, but also a mixture which has about the same consistency as those solutions which are generally used for forming the test sheets. Of course we get a new copper figure, but the procedure enables us at once to use the very same pulp solutions with which we prepare the test sheets, for the determination of the copper number without inefficient filtering, drying or other handling. All we have to do is mix well and measure 500 cc. The test sheets will give the weight on a reliable average, either air dry or bone dry.

Below are given some of the results thus obtained. The freeness was tested with a Greens apparatus. One hundred grams dry pulp were beaten a certain number of revolutions in an Abbe ball mill with 5000 grams of pebbles, 60 revolutions per minute. This I think is superior to time beating, as practiced in some mills (60 r.p.m. is somewhat high for a ball mill). The pulp was removed and the solution made up to 20 liters and well mixed. The temperature should be noted and kept uniform, especially in regard to the freeness test. The test sheets were made on a Datas sheet machine and 5 or 6 sheets were formed, each taking one liter of stock, pressed between felts under 100 lbs. per square inch for one minute and dried at approximately 70 degrees C.

Tests Carried Out Immediately

Testing on the Mullen tester was carried out immediately after drying in the oven, as no room for conditioning was available. The first lot was tested also on a Schopper double folding tester. Four test sheets were popped eight times each, well across the area. All 32 results were added and divided by the bone dry weight of the sheets. The result was the strength figure given below.

For the copper number determination, two lots of 500 cc each of the pulp mixture, corresponding to about 2 to 2½ grams of pulp, was measured into beakers and each sample put in a one liter flask. Thirty cc copper sulfate solution (10 per cent crystalline copper sulphate C.P.) was measured into the corresponding beaker and 190 cc alkali solution (2) added. (Solution No. 2 consists of 130 grams sodium carbonate anhydrous C. P. plus 50 grams sodium-bicarbonate per 1000 cc). The double amount was used as is generally done with the S-B copper number method, as it was thought essential to have a sufficient alkali and copper concentration in the very diluted pulp mixture. It turned out later, however, that half the amount used gave higher coppers number, which is rather surprising.

Ninety Four Degrees Temperature

With a little shaking of the beaker, the precipitate of copper carbonate first formed dissolves and the clear solution is added to the pulp sample. The flasks are then inserted in a steam bath, the mouth of the flask covered with a glass bulb or small funnel. The temperature, which is maintained by the steam itself, was 94 degrees C.

In the first lot the flasks were heated for exactly two hours, filtered and manipulated in the usual man-

ner for the determination of the copper number. The precipitate should not be sucked dry to prevent any chance of oxidation. It also must be dissolved in ferric alum-sulfuric acid solution, because the rest of the copper is precipitated as black cupric hydroxide. The cuprous oxide, or rather the ferrous sulphate is titrated with permanganate and the former calculated as usual. Later on, the flasks were heated three hours, because in some cases the third hour still gave a substantial rise in the copper number, while the fourth hour did not add very much.

The new figure R-number—(RN) was obtained by the following equation:

$$\frac{\text{Strength} \times \text{Freeness}}{100 \times \text{Copper number}} = \text{RN.}$$

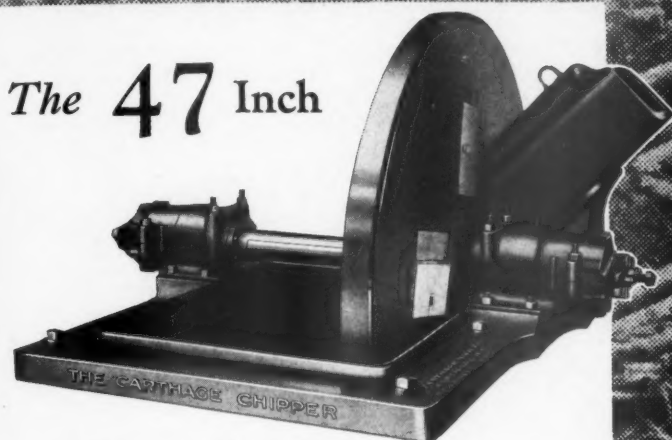
Seven samples of brown stock of different origin were first tested:

Sample No.	Strength	Freeness	Corrected Freeness	Per Cent Consistency	Copper No.	R No.
1.	132.0 143.7 148.0	460 370 ---	400 305 ---	0.40 0.39 0.40	0.84 0.85 0.84	629 520 ---
2.	139.7 130.5 143.1	465 350 315	420 312 235	0.37 0.37 0.36	0.61 0.76 0.81	964 536 410
3.	151.7 141.0	370 ---	295 ---	0.37 ---	0.78 0.49	575 ---
4.	115.4 135.0	465 370	420 325	0.42 0.42	0.84 0.77	577 569
5.	122.8 134.4 145.0	490 405 325	475 375 290	0.48 0.44 0.43	0.76 1.02 1.04	766 494 405
6.	123.3 127.7 146.6 131.0	480 400 340 185	460 325 315 120	0.46 0.37 0.45 0.39	1.07 0.93 1.35 0.95	530 446 342 165
7.	12.4 81.5 91.6 105.2	690 522 475 395	770 522 470 395	0.67 0.50 0.49 0.50	1.24 1.10 1.37 1.32	77 357 320 315

Then eight bleached samples from other mills were investigated:

8.	140.4 146.6 134.6 119.3	385 335 310 228	325 255 240 158	0.40 0.37 0.38 0.38	1.06 1.01 0.80 0.72	430 371 404 263
9.	121.6 118.4 122.4	410 350 260	320 270 180	0.35 0.37 0.37	1.41 1.74 1.17	276 184 188
10.	130.5 133.3 100.6	375 275 178	315 205 100	0.40 0.39 0.37	1.57 1.04 1.02	262 262 99
11.	95.2 92.3 91.7	345 255 140	250 125 75	0.35 0.31 0.39	1.33 1.42 1.47	178 81 47
12.	110.8 126.1 114.6 126.2	440 335 390 153	370 250 320 90	0.38 0.36 0.39 0.39	2.42 1.55 1.85 2.60	169 203 198 44
13.	111.6 128.0 111.8 82.5	437 325 225 150	362 240 125 60	0.37 0.36 0.34 0.35	1.65 1.36 1.61 1.63	184 226 87 30
14.	113.7 131.0 132.6 112.0	475 285 260 175	425 230 185 105	0.41 0.40 0.37 0.38	0.64 0.44 0.70 0.67	755 685 350 176
15.	120.3 139.7 141.8 99.3	480 280 235 168	410 220 180 70	0.38 0.39 0.40 0.34	0.58 0.64 0.45 0.49	850 481 568 143

All freeness tests of the samples above were made in water of 10 degrees C. All figures were corrected to 0.5% consistency according to the tables and graphs supplied by the Forest Products Laboratory of Canada, December, 1925. These tables cover the freeness up to 0.4% only, but the additional 0.1% can be interpolated. They were also made for ground wood but, lacking any



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Northwestern Pulp & Paper Co., Tacoma, Wash.
Cascade Paper Company, Tacoma, Wash.
Columbia River Paper Mills, Vancouver, Wash.
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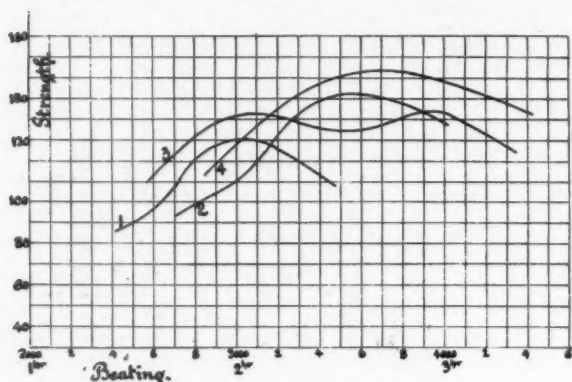
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other means, the assumption had to be made that conditions would be about similar with chemical pulp. The results verified this idea later and since the copper number question proved to be more difficult and the influence in variation of it more decisive, the work on freeness for chemical pulp under varying conditions was abandoned. This work can well be done by a committee or university laboratory later on. Perhaps a standard consistency of 0.4% might also work better. The double folding tests are not given above because no formula could be found to give a nearly constant figure. Also other chemical tests are omitted.



Curves illustrating Dr. Richter's Research

In looking over the table above it can be noted that frequently the copper number moves irregularly. There seems to be no reason for it. Frequently, it can be observed, the new figure has a tendency to become constant, at least up to about the maximum strength, and it could be hoped a real constant would be obtained if the copper number was more exact.

A greater number of control tests showed this to be possible if the flasks were heated three hours instead of two. Some pulps gained 50%, some less than 10%. With the fourth hour, on an average, less than 5% was gained. It was, therefore, decided to heat for three hours.

A number of other samples were tested. (Brown stocks.)

Sample No.	Strength	Freeness	Corrected Freeness	Per Cent Consistency	Copper No.	R No.
16.	105.4	423	433	0.52	1.43	319
	124.0	308	318	0.52	1.30	303
	108.3	335	325	0.48	1.32	267
17.	106.4	315	330	0.53	1.48	237
	134.0	250	245	0.49	1.15	286
	124.5	220	225	0.51	1.11	250
18.	114.4	305	300	0.49	1.26	272
	136.8	250	240	0.48	1.24	265
	128.0	190	180	0.48	1.00	230
	126.6	195	190	0.49	1.06	227
19*	23.6	720	710	0.48	1.89	88
	89.7	368	363	0.49	2.45	133
	96.4	260	240	0.46	1.93	120
	97.1	181	151	0.44	2.74	54
	93.2	115	110	0.49	2.46	42
20.*	18.6	675	635	0.43	1.54	77
	108.9	280	270	0.48	1.57	187
	118.9	236	231	0.49	1.67	165
	96.1	175	140	0.43	1.87	72
21.	86.8	300	285	0.47	1.72	90
	109.0	210	180	0.44	2.40	80
	95.7	130	120	0.48	1.97	58

*Unbeaten stock.

All the samples tested so far were sulphite pulps of a mixture predominately hemlock of different origins. Having acquired the same habits of procedure when

testing, the two determinations of the copper number always checked fairly well.

A sample of eastern bleached spruce pulp follows:

Sample No.	Strength	Freeness	Corrected Freeness	Per Cent Consistency	Copper No.	R No.
22.	86.5	315	320	0.51	1.68	167
	93.6	315	290	0.45	1.53	183
	106.0	195	200	0.51	1.42	188
	-----	-----	-----	-----	1.46	-----
	-----	-----	-----	-----	1.42	146
	-----	-----	-----	-----	1.48	-----

It can be seen from the above tables that it is very probable, if not positive, that by using the copper number outlined above as a chemical test, it would at last permit an independent evaluation of sulphite pulp in connection with a standardized strength and freeness test. Naturally it will come between some limits of freeness and, as seen, ahead and eventually including the maximum strength, a feature for which we have searched for about 20 years. Of course it is very peculiar that the method checks with freeness and Mullen test, the way they are standardized at present, but the fact remains, and I am sure it will allow a standardization into the Cm./gr./sec. system with equal uniformity later on.

Some tests on unbeaten stock were also made, as it was known that efforts had been made in some quarters to standardize strength etc. on unbeaten stock. Although nothing definite can be said yet as regards this procedure in connection with the new copper number, it seems reasonable so far to use beaten stock in every case.

The last R-number in experiment No. 22 shows a drop. This would indicate that 106.0 strength is beyond the maximum. In all experiments the R-number seems to be about constant between 400 and 200 freeness.

The next thought was "Can this figure be applied to all chemical pulps?" And further, "Does it apply also to the beater or other milling machinery?" I have to leave the definite answers still open to more detailed research work. One sample of sulphate pulp, however, was tested in the ball mill as follows:

Sample No.	Strength	Freeness	Corrected Freeness	Per Cent Consistency	Copper No.	R No.
23	161.7	310	355	0.58	0.30	1913
	191.2	235	235	0.50	0.25	1797
	167.6	225	225	0.50	0.27	1400

A sample soda pulp from cottonwood (unbleached) gave:

Sample No.	Strength	Freeness	Corrected Freeness	Per Cent Consistency	Copper No.	R No.
24	65.2	420	400	0.46	0.13	2005
	92.5	335	300	0.43	0.15	1850
	106.2	320	295	0.45	0.16	1735
	-----	-----	-----	-----	0.17	1843
	-----	-----	-----	-----	0.18	1740

As can be seen, it seems to apply also to soda and sulphate pulps, although they belong to another class, owing to the very high freeness and very low copper number. Also much more depends on the exact determinations of the copper number.

With regard to the second question above, a tentative experiment was carried out with the stock No. 18, the only foreign sample of which sufficient supply was on hand.

About 1800 grams of pulp were charged into an experimental beater, brought to a consistency of about 3.5% and a brushing action of the roll maintained throughout, with the exception of the time between test E and F, when it was desired to bring the freeness down to about 250. This effort, however, did not succeed. The roll was brought down somewhat harder between

(Turn to page 138)



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Problems of the Western Industry

(Continued from page 80)

grades, are being made, largely from mill wastes, and apparently with profit. Wilt (5) reports that the quality of pulp produced (bleached sulphite from mill waste) is at least equal to and in most instances is far superior to the very best grades of Eastern spruce sulphite.

Mill Waste Available

Wood is available to the Western pulp mill in various forms on more or less of a competitive basis. Considering the cost of a unit of chips in the bin as a satisfactory measure of wood cost, it appears that converting waste (for example, planing-mill waste) is cheapest, saw-mill waste is next, then comes low-grade "no-market" lumber, and low-grade saw logs follow, with cordwood and woods waste probably most expensive on the average. It is apparent that utilization of such material constitutes coordination rather than competition with the lumber producer. Continuity of the supply of raw material to the mill is well assured, since in case of failure of the cheapest form the next cheapest can swing into use. This situation in fact stabilizes supply and demand, and relative costs.

The supply of spruce and hemlock mill waste located on deep water is utilized for pulp with a fair degree of completeness; some mills use also No. 3 Common hemlock lumber and low-grade saw logs of the same species. In many plants the huge wood pile so familiar a sight in other pulp manufacturing regions, with its investment and inevitable decay, is largely missing; this desirable situation, of course, is basically possible because of year-round logging. Chips from waste are being transported considerable distances both by rail and by barge. The often repeated objections to the use of mill waste seem without question to have been overcome. The previous consistent decrease in the amount of "slabs and mill waste" reported consumed (2) in the United States has been quoted to indicate the difficulties attending such use. The quantity consumed, however, has been increasing steadily since 1922 until 1926 shows 180,000 cords, the highest amount since 1917. Hodgson (6) says, "Nearly all of the pulp plants are using some mill waste; almost without exception new pulp plants have been located with reference to the utilization of mill waste."

Utilization Waits Logging Ingenuity

In the sum total, Douglas fir sawmill waste is available in large quantities. In certain local areas adjacent to concentrated population, however, all this waste is hogged and consumed for power generation in thoroughly modern and efficient plants competing in the open market. Since at times an actual shortage of hogged fir waste exists in certain areas, it appears that this waste is in real demand as a power fuel. Obviously, then, this material will tend to increase in cost to a value approaching that of the next cheapest fuel.

The enormous supply of woods waste (6, 7) has not been drawn upon to any extent. The utilization of this waste awaits a combination of clever logging engineering to bring it to a consuming center cheaply, and of a consuming demand involving a greater tonnage and a wider variety of species than those now employed. Fifty per cent of the extreme waste in high-lead logging is probably suitable for high-grade pulp. Efforts are now being made to harvest this material

HERITAGE HIGHLIGHTS

Fifty per cent of the extreme waste in high lead logging is probably suitable for high grade pulp.

The use of Douglas fir in strong, light-colored papers would be advantageous in many respects. This objective may not be so difficult of accomplishment as it would seem.

Another problem is the further integration of the timber-using industries.

Extended utilization of waste, particularly woods waste, will come. Just to say that utilization is economically not feasible merely begs the question and admits ignorance of how it may be profitably obtained.

Satisfactory pulps and papers of wide variety, including the finest grades, are being made, largely from mill wastes, and apparently with profit.

The often repeated objections to the use of mill waste seem without question to have been overcome.

The utilization of woods waste awaits a combination of clever logging engineering to bring it to a consuming center cheaply, and of a consuming demand involving a greater tonnage and a wider variety of species than those now employed.

Utilization of logging and sawmill wastes by the pulp industry constitute coordination rather than competition with the lumber industry.

The margin on the cost of wood between the East and the West is approximately \$11 per cord.

The opportunity of the Western states lies in producing the strong, lighter-colored pulps and papers; present expansion there is demonstrating that fact.

as pulp wood (7). The development of this operating procedure, with its light equipment, will probably later serve well in harvesting thinnings under more intensive forestry.

Utilization of primary waste at many sawmills, regardless of species, is becoming closer both by employing resawing and by producing random short and narrow stock for remanufacture directly into commercial articles sold as such and not as lumber. Thus the time is at hand when the sawmill can direct its by-products into whatever channels produce the greatest revenue, a highly desirable situation. Utilization may be seen at present throughout the entire range, from complete integration with burner dismantled to small integration with a relatively large amount of waste being burned. Sawmill, planing mill, pulp mill, and power house are capable of complete and self-contained profitable integration. How far this improvement has gone in any given plant depends to a considerable extent on the size and location of the individual units. The pulp mills now located on deep water and integrated with sawmills have the cheapest possible wood supply.

Apparently the form in which to transport wood waste for chemical pulp most cheaply is as chips. Sawmill waste is being handled thus, in general. A start has been made at chipping woods waste at the logging operation, and more recently announcement was made of the erection of a chipping plant at a pulp-wood cutting operation. These developments will greatly influence the commercial availability of woods waste.

Some Immediate Problems in the West

For a full description of the more important forest types and the timber-growing problems, the reader is referred to the bulletins of the Forest Service, U. S. Department of Agriculture, on the general subject of timber growing and logging practice (8, 9, 10).

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it is necessary first to consider the question of species of timber. The relative stand of each species available in the West is of primary importance. All authorities place Douglas fir first and Western yellow pine second. Western hemlock and the true firs are next, then comes Western red cedar and redwood, and lodgepole pine and other species of smaller stand follow.

The annual cut of lumber is important too, not only as an indication of possible integration of plant units but also because of the forestry problems to be met, solution of which might be aided by utilization of the species for pulp. In 1925, the cut of Douglas fir was first, Western yellow pine second, and hemlock third (2).

Tidewater Timber Stands

The location of the stands, particularly in relation to tidewater, also is important. Sitka spruce, Western hemlock, Douglas fir, and cedar are located about equally well, while some of the true firs are at a slight disadvantage and much of the pine is inland. In this same connection the extent of the area over which each species occurs is of interest; the wider the distribution, in general the greater the potential benefit. Douglas fir, Western yellow pine, the true firs, and cedar are widely distributed.

The present market value of the various species bears on the question of their desirability, in that high value goes with close utilization and, conversely, "inferior species" contribute greatly to wastes all along the line and broadly affect the practice of forestry. In the Pacific Northwest the order of value from high to low is: Spruce and cedar, Douglas fir, and hemlock. In the Inland Empire the order appears to be white pine, Western yellow pine and cedar; and larch, Douglas fir, white fir, and hemlock. As a matter of fact the differences between species in the value of low-grade sawlogs are relatively small.

A general compilation of log prices for 1924 (2) puts the Western species definitely in the following order:

White fir	\$10.35 per 1000 ft. log scale
Lodgepole pine	10.80 per 1000 ft. log scale
Western hemlock	12.71 per 1000 ft. log scale
Western yellow pine	13.23 per 1000 ft. log scale
Engelmann spruce	13.30 per 1000 ft. log scale
Western larch	14.24 per 1000 ft. log scale
Incense cedar	14.24 per 1000 ft. log scale
Douglas fir	15.35 per 1000 ft. log scale

The list, of course, may be extended.

"Inferior Species" Problem

The logging waste of the so-called inferior species constitutes an almost universal problem. The utilization of Douglas fir, white fir, larch, and hemlock is very far from complete in white pine operations, and white fir and incense cedar are generally regarded as inferior species in the California pine region. Lumbering operations in general have discriminated particularly against the true firs.

The suitability of a given species for pulp and paper manufacture, which determines the possibility of utilization of wastes, low-grade logs, and small trees, whether from thinnings or clear cuttings, is of great importance as regards future loggings methods and intensive forest management (11).

Additional revenue thus made possible, of itself per-

mits the financing of improved practices. Fire hazards after logging must be decreased, natural reforestation increased, and valuable species retained in new stands. Without presenting the detailed evidence, it appears that greater, or at least as great, benefit will accrue in these matters if Douglas fir and the true firs can be made suitable for a wide variety of definite grades of paper products, and if Western hemlock, already extensively employed, can be made of increased utility for mechanical pulp. Large areas of cut-over Douglas fir lands are reforesting naturally, and white fir and hemlock are even excluding the species considered more desirable at the present time.

One of the important factors in such rating of species is the ease of securing natural reforestation. This has to do with seeding, germination, and seedling growth. Douglas fir has every characteristic favorable to its abundant reproduction and no inherent traits to prevent its plentiful natural propagation. Hemlock is enormously prolific and Sitka spruce, cedar, and white fir reforest naturally with ease.

High Comparative Growth

Comparative rate of growth should be high in any species to justify a prominent place in immediate development work. In the California pine region white fir is the most rapid grower. The Douglas fir forest type, including the fog belt trees, is rated first under present conditions, and second only to redwood under intensive forestry (2, Table 12).

Summing up the foregoing, it appears that, in the field of increasing the utility of particular species for pulp and paper, Douglas fir demands high priority. Its use in strong, light-colored papers would be advantageous in many respects; such papers are now heavily imported and also are derived largely through sulphite pulps from Eastern spruce. This objective may not be so difficult of accomplishment as it would seem. Many species other than the spruces and the hemlocks have produced satisfactory, strong, light-colored papers (12). Species once considered unsatisfactory for any use are now largely employed commercially; Jack pine is an example. Western hemlock and the true firs likewise demand priority in development for use in light-colored papers requiring large amounts of groundwood.

Finished Paper As Criterion

As sound technical findings become available, the tendency is toward an enlargement of the number of species suitable for a variety of papers; the suitability is based on the use requirements of the sheets as consumed, which is the only consideration of importance as far as quality is concerned. Studies of the utilization of any species must be based on some definite broad grade of finished paper and be carried through to that end; it is hazardous to stop at pulp in proving the utility of a new species.

Particular species have been discussed. A problem of equal importance lies in more nearly complete utilization of the chips in the pulping process. So-called high-yield, mildly cooked pulps (13, 14), in which 60 to 75 per cent yields (based on the weight of the dry wood) are obtained, are amenable to the production of strong, light-colored papers and are beginning to appear commercially. These processes are undoubtedly applicable to Western species.


(Turn to page 128)



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Pulp and the Logging Industry

(Continued from page 88)

one-half inches at breast height, or certainly nine inches or more on the stump.

All yield tables that are on any basis but actual wood volume have arbitrary utilization standards, usually counting trees above a given diameter four and one-half feet from the ground. To be accurate they must regard differing productivity of lands, or site-classes as the forester puts it. The stocking of the land also varies. Mixture of the shade-bearing pulp species with Douglas fir or pine will produce more than either alone, for the one capitalizes the light supply and the others fill in without dying. But the work done by foresters on all species in the Pacific Northwest has developed a fairly good rough working rule; namely that on the better classes of land, production of any and all will run around two cords, more or less, to the acre a year, or say 75 cords at 40 years, and at other ages similarly except that this is a rough rule and the very highest average annual productivity is usually not attained earlier than 60 years because growth does not begin to slow down till then.

Eastern Yield Smaller

But think of this: Ten cords to the acre is considered a good pulp cut in the eastern states and to get it they go after stuff that takes from 90 to 200 sticks to the cord, being eight-foot sticks up to a two-inch top diameter. About the biggest stick they get is 12 inches in diameter and the bulk averages four to six inches. One of the biggest paper companies on the continent, owning vast areas in the United States and Canada, reckons that with blank spaces, reforestation and all, its lands cruise less than four cords an acre today. Now go back to our roughly-figured two cords a year production; multiply by any age you like; discount to beat the band for bad luck, insufficient stocking, or site difference; and it still looks like we have a country for growing pulpwood.

I have not touched on cottonwood, the prize pulpwood, for it is a small factor with most of you. But I do want to mention alder, which takes a lot of our cutover land. It will be a big pulp wood in this region some day, for its qualities for the soda process are close to those of cottonwood. The Forest Service (and I want here to appreciate also the great help by the Pacific Northwest Forest Experiment Station in giving volumes of yield data which I have reduced to the two-cord rule-of-thumb calculation, without, however, committing Director Munger to its universal accuracy), shows alder production from one to two cords an acre annually. It mentions a 35-year stand with more than a hundred trees to the acre over eight inches and many twice that. I have photographed 16-year alder on St. Paul and Tacoma cutover land over a foot in diameter. Alder is going to sit pretty in a competition between pulp and furniture demands; the very earliest, bar cottonwood, of our woods to pay its way. The more you have of it the better.

Quick Yield Bridges Gap

The conclusion is that we have coast and mountain belts where early yields of the best pulp species are more promising as quick and profitable turnover, because of earlier utilizable and certainty to be wanted by pulp mills originally established to use the mature supply of the same species, than the second crop of

our more appreciated saw timber species. Which does not lessen the promise in the latter at all; only gives us aid in bridging the gap till they also pay their way.

Then we arrive at the problem of making the pulp species take the ground to serve. Here we meet the silvicultural angle. What treatment in slash disposal, seed supply, etc., will give our Cinderella pulp species a good chance to become the beloved princess? This we are studying, with a fair idea of the answer. I am making it one of the chief projects of the Western Forestry and Conservation Association, linked with study of the eastern and southern ability to compete. But you do not require this of me today. It has as many answers as your lands have differences.

Perhaps, however, in dealing with generalities only, I have talked too much of the extreme Northwest region and not enough of California and Idaho, the first with its ready white fir production and the latter with its residual hemlock and fir stands where white pine has been removed. Here, as I see it, standing ready to be corrected by the expert in pulp economics, we have also the advantage of a dependable supply of the best pulp woods, but a temporarily more obscured vision of the concentration of manufacture. I cannot but believe, however, that this will work out eventually to create a profit in such material of which the nation cannot produce too much—unless!

I have saved this "unless" until after developing the conservative picture built on today's relative valuation of pulpwoods and most likely to be approved by today's pulp industry. There are, however, alert scientific students who make a very different prophecy. It is that processes will be found to make good papers and other products of nearly all woods, minimizing if not destroying today's advantage of the so-called pulp species.

Raisin' Hell Uphill

Therefore, aside from seeking shipping advantage for its product, the industry will concentrate where wood can be had cheapest, as in the South and on this coast, especially if near enough to tidewater for cheap freights to world markets. The northern pulp countries will yield to climatic advantage. And if this comes to pass, even partially, we shall, as forest owners and loggers, profit according to our comparative ability to grow Douglas fir or anything else to pulp size cheaply. And if the industry thinks we can, it will settle among us and then it will have to have all our young growth as the old plays out. So remember our two cords a year or better.

Now do I conclude by addressing you as forest land owners, or as loggers? Presumably as loggers. Get your mind on methods that do not destroy these pulp values, but that take care of them, even if this violates some old beliefs that good logging is to get a bigger donkey and a heavier line and a longer crane than anybody else ever had and raise hell uphill with the big logs.

Hemlock Predominates in Alaska

Western Hemlock is by far the most common tree of southeastern Alaska, occurring throughout the region and constituting the great bulk of the commercial timber. In association with other species it forms dense forests from tidewater to elevations between 1,500 and 2,000 feet.—From "Pulp Timber Resources of Southeastern Alaska."

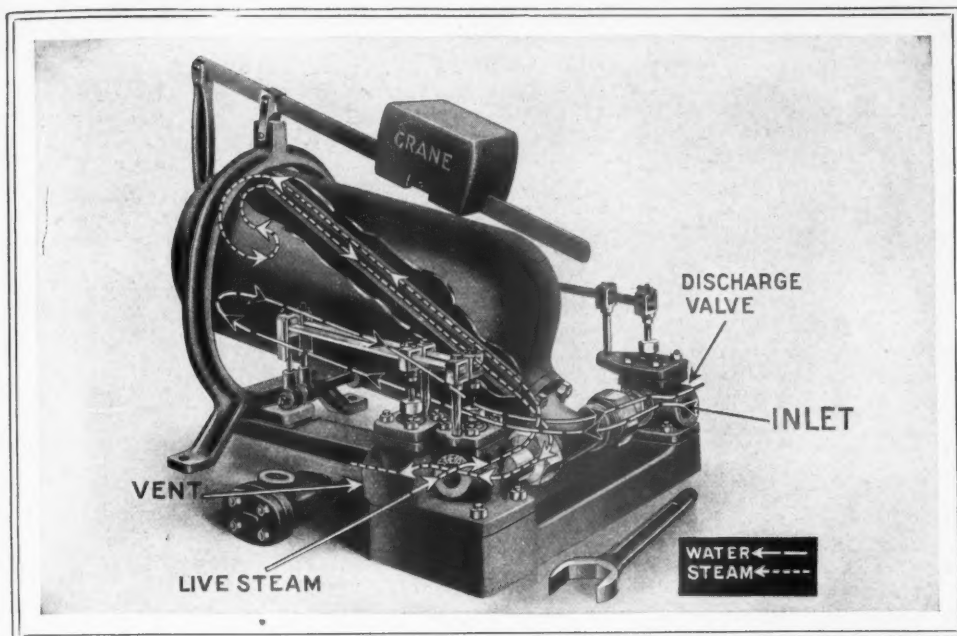
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Logging Waste in the Douglas Fir Region

(Continued from page 84)

If present developments in the pulp making industry are any indication of what may be expected in the future the pulp and paper business offers one of the greatest potential outlets for the logging waste on the West Coast. In years past only a negligible amount of mill waste was used by the pulp and paper industry in Oregon and Washington. Now nearly all of the pulp plants of these two states are using some mill waste. In a few cases the lumber mill and pulp and paper mills are integral parts of the same plant and practically complete integration obtains.

As the demand for raw material increases and cheaper and better methods for getting the logging waste from the woods to the mills are perfected the pulp mills will no doubt turn more and more to that great source of supply. Some paper pulp mills are already looking to this accumulation of raw material and are becoming interested in machinery by means of which it can be profitably salvaged. The problem contains many involved factors, but these can largely be overcome, as is being demonstrated by at least one company within the region.

Re-logging Cuts Waste

This operator has for years been making a study of methods of logging that would make possible the salvaging of small logs and broken chunks. It has finally developed a plan of re-logging after the first logging operation has passed on. The method adopted, which involves the use of light, mobile, gasoline-driven machinery, has passed out of the experimental stage and has assumed the proportions of a commercial venture. As an indication of the size of the operation, this company, during a run of four months, salvaged from its slash fields about four million board feet of small logs and chunks and operated at a fair profit. Logs as small as 12 feet long and logs with a top diameter of only 4 inches were yarded and utilized for paper pulp after being railroaded and rafted a distance of more than a hundred miles to the pulp mill. The average log taken out by this operation contained only 155 board feet. About 12,000 feet board measure or 24 cords of wood per acre were saved from the slash fires for a profitable use in this way.

Sustained Yield

Aside from the direct returns in the form of pulpwood secured from the re-logging operation it must be taken into account that this company is cutting its forest with a view to sustained yield. Having a stand of virgin timber that will last, under the old plan of logging about 50 years, it finds that by closer utilization, made possible by the new plan of re-logging, present milling requirements can be met and the period of rotation will be extended a number of years. Moreover, the removal of the small logs and chunks reduces future fire risk and leaves the land in better shape for the new crop of timber. Incidentally, it may be of interest to point out that a large part of the cut-over lands of this company are being planted to young Sitka spruce trees, grown at its own forest nursery.

There is no reason, other than the lack of an adequate pulpwood market, why there should not be logging operations in Oregon and Washington designed to take out sawlogs and also to secure pulpwood from the logging waste, or why operations in stands containing a large percentage of pulp species should not be designed to secure sawlogs from the material most suit-

able for that purpose and pulpwood from the remainder of the stand. There are great possibilities in the integration of the lumber and pulp industries which would make entirely feasible large use of both logging and sawmill waste for pulp. A good start toward such a combination, both at the mills and in the woods has already been made.

Waste, wherever you find it, is a liability rather than an asset. When conditions are such as to make possible the use of large quantities of material, which at present are being left in the woods as logging waste, for pulpwood and other commodities, a greater volume of merchantable wood will be secured from our forests. It follows that everyone connected with the wood-using industry, the pulp mill operator, the owner of stumpage and the consumer at large, will profit.

Editor's Note: This study of woods waste takes into consideration only the Douglas fir region of Western Washington and Oregon. As the Douglas fir region covers also the extensive British Columbia coast and as logging conditions and topography have, no regard for international boundaries, the woods waste in British Columbia must be reckoned to secure a true picture of logging waste in the Pacific Coast timber belt. No figures on waste in British Columbia are available, but a good estimate may be computed by applying Mr. Hodgson's averages to the British Columbia territory. Mr. Hodgson estimates an average waste for the Douglas fir region of 21,407 b. f. to the acre. This is equivalent to about one-fifth of the original stand before logging. The report of the B. C. Forest Service for 1928 shows a total cut of 2,723,941,046 b. f. for the Coast region (which virtually covers the Douglas fir belt) and a total cut for the province of 3,206,905,466 b. f. Using the smaller figure, which more nearly compares with the Douglas fir area covered in the survey in Washington and Oregon, and assuming one-fifth of the original stand to be left in the woods as waste, we have an estimated woods waste in British Columbia of 1,361,970 cords. (One cord is equal to 500 b. f.) Adding this figure to Mr. Hodgson's total for the United States side we have an estimated total annual woods waste in the Douglas fir region of the Pacific Coast of 7,809,970 cords.

Problems of the Western Industry

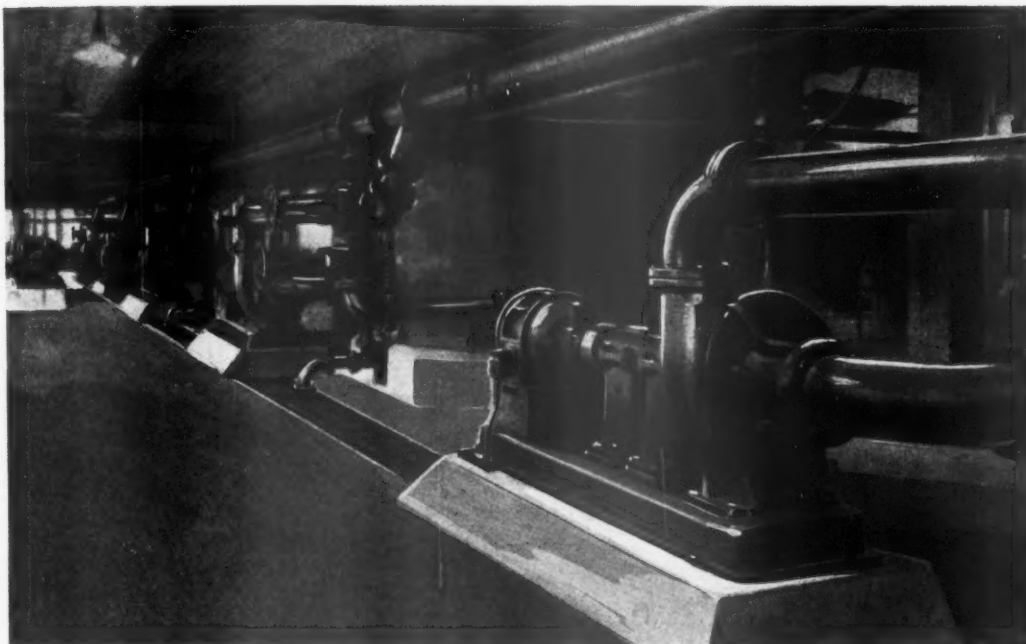
(Continued from page 124)

Among the splendid developments broader in scope than the immediate pulping and paper-making problems but inseparably linked with them is the further integration of the timber-using industries, involving the manufacture of lumber, of planing mill and other re-manufactured products, of by-product fuel, of by-product power, of pulp, paper, and converted products and of other commodities, perhaps chemical in nature, all as units of one organization properly manned for technical development of high quality.

Extended utilization of waste, particularly woods waste, will come. Just to say that utilization is economically not feasible merely begs the question and admits ignorance of how it may be profitably obtained. Three possible avenues of development present themselves:

1. Improved logging equipment and operating methods to reduce waste, with no greater logging cost.
2. Improved equipment and operating methods to collect the logging waste cheaply enough for marketing (15).
3. Improved processes to provide a marketable commodity based on this cheaper cost of collection of waste.

Three definite lines of attack on the last avenue of development, with which this discussion is principally concerned, have been selected, in harmony on the one hand with the production-importation situation and on



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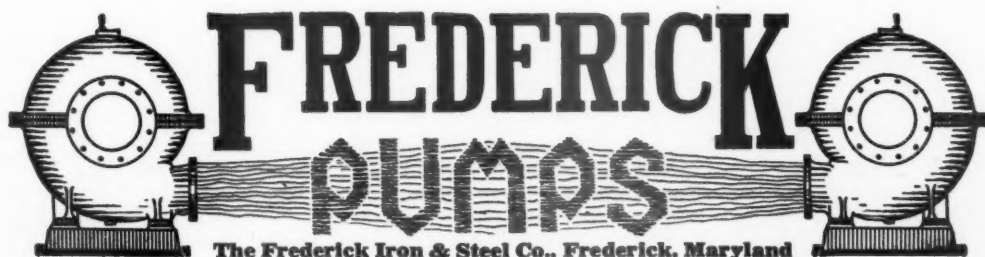
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the other hand with the forestry and logging elements:

A. The production of strong, light-colored papers from Douglas fir.

B. The production of light-colored papers, requiring mechanical pulp, from Western hemlock and the true firs.

C. The production of medium-quality, large-tonnage papers of various types by the mild pulping processes and particularly the production of semi-sulphite paper from Western hemlock and the true firs.

In concluding, fundamental problems must not be overlooked because applied problems of such urgency are waiting. The present enlarged range of pulp species and the development of new and of modified pulping methods are the result of fundamental research in the past. Likewise, future developments will depend upon the extension of fundamental knowledge covering all phases of timber growing, harvesting, and use. Basic research must continue to progress, for otherwise the lack will manifest itself seriously when the demand comes for immediate and practical application of such knowledge.

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Homely Philosophy

Two old pioneers, their hands showing the marks of years of toil and their grizzled countenances indicating that what they had in this world they had gained by their own hard efforts, sat waiting for the stage. They were discussing men. From the lips of one fell this worth while bit:

"I ain't got no time for a lazy man. I don't mind a feller feeling tired after he's done something, but I sure ain't got no use for a lazy man."

Canadian Exports of Pulp and Paper, 1928

Increasing dependence of the United States upon Canada for its pulpwood and paper supplies is shown in the complete tabulation of Canadian exports of these products for the year 1928. While the United States import figures are not at this time available to check against the Canadian figures, the Canadian exports are, nevertheless, an excellent index of United States imports since the latter nation is Canada's principal customer. Total Canadian exports of paper reached \$147,156,792 in 1928, showing an increase equivalent to nearly one and one-half million dollars a month over the 1927 figure. Newsprint and wrapping exports showed marked increases, but other grades fell off.

A study of the comparative exports of the different grades of pulp between the years 1927 and 1928 is interesting. Mechanical pulp fell off heavily in tonnage and even greater in total value, due to the poor market for this grade and the march of newsprint across the international boundary. On the other hand, both bleached and unbleached sulphite pulps showed good gains over 1927, although the value did not advance in proportion, due to falling markets. Sulphate pulp fell off, a fact attributable, no doubt, to the recent activity in the Southern United States and on the Pacific Coast in building kraft mills. Export of screenings nearly doubled. This should be accepted as a healthy sign, indicating a closer attention perhaps to elimination of hitherto waste and a step toward closer utilization.

Pulpwood exports also showed a decline.

The official report of the Canadian Pulp & Paper Association states that the exports of pulp and paper from Canada in the year 1928 show an increase of \$16,168,316 in the value of wood-pulp and paper exports as compared with 1927, the total for the year being \$192,771,615 as against a total of \$176,603,299 in the preceding year.

Wood-pulp exports for the year were valued at \$45,614,823, which was a decline of \$1,381,188 from the 1927 total of \$46,996,041.

Exports of paper for the year were valued at \$147,156,792, as compared with \$129,607,258 in 1927, an increase for the year of \$17,549,534 and a new high record.

Quantities and values for the year were as follows:

	Year, 1928		Year, 1927	
	Tons	Dollars	Tons	Dollars
PULP—				
Mechanical	203,670	5,546,120	260,831	7,761,464
Sulphite Bleached	251,543	19,112,964	237,228	18,407,169
Sulphite Unbleached	214,127	10,738,977	192,559	10,269,560
Sulphate	162,772	9,395,866	169,691	10,193,307
Screenings	31,694	620,896	18,846	364,511
	863,806	45,614,823	879,155	46,996,011
PAPER—				
Newsprint	2,206,587	141,103,527	1,881,867	123,222,094
Wrapping	16,062	1,755,652	114,092	1,583,928
Books (cwts.)	71,802	588,671	99,870	690,680
Writing (cwts.)	6,892	58,600	15,357	124,787
All Other		3,650,342		3,985,769
		147,156,792		129,607,258

Pulpwood exports in 1928 amounted to 1,532,266 cords valued at \$16,269,660, as compared with 1,541,769 cords valued at \$15,702,705 exported in 1927.

The New York Herald Tribune on September 16, 1928, published what was the largest issue in its history to that date. The issue included a total of 240 pages. Twelve hundred rolls of news print, each weighing from 1200 to 1400 pounds were used for the edition.

Washington is now fourth among the states in annual consumption of pulpwood.



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Domestic and Export

Interior British Columbia

(Continued from page 96)

these stands of young thrifty timber have a greater potential value than the over-mature merchantable stands which are liable to become a prey to fungi, insects, and wind, before they can be cut.

From the foregoing it may be taken that from the standpoint of pulpwood supply the interior is well prepared for the demands of the future. In the matter of waterpower it is similarly well situated.



A camp scene in a shelter of balsam and spruce in interior British Columbia on the Horsefly River, Cariboo district.

The provincial government has been carrying on a survey of the water power resources of the interior and, while detailed statistics are not available, it has been ascertained that the potentialities are very much greater than had hitherto been imagined. At present most of the water power developments have been undertaken by companies whose first interest has been the supply of electrical energy for metallurgical purposes in the Kootenay district, but within the last few months many inquiries have been received by the government for water powers to be used in connection with the pulp and paper industry in the East Kootenay district, the Quesnel district and other localities. The most important of the interior power propositions linked with the pulp and paper industry is that at Prince George and it would seem as though this will be undertaken as soon as market conditions become more stabilized.

Government reports indicate that power may be developed at the following points, many of which are close to important pulpwood stands and may some time assist in establishing the industry in the interior: Falls River, capable of developing 15,000 horsepower

near the confluence of the Ecstall and Skeena rivers; Khatada River, 9,000 horsepower, a tributary of the Skeena; Nass River, 100,000 horsepower; Quesnel River, north fork, 4,000 horsepower; Quesnel River at Little Canyon, 22,000 horsepower; Moose River, near Mount Robson, 24,000 horsepower; Upper Falls on Fraser River, 5,500 horsepower; Lower Falls, Fraser River, 5,500 horsepower; Skeena River, 40,000 horsepower; Bulkley River, 80,000 horsepower; Murtle River, a branch of the North Thompson, 36,000 horsepower; Adams River, near Kamloops, 21,000 horsepower; Kootenay River, 200,000 horsepower; Pend Oreille River, 250,000 horsepower.

Railways will play an important part in the development of the interior pulp and paper industry and it is expected that the Pacific Great Eastern Railway will prove a valuable adjunct to any mills established within its wide tributary area. This railway runs north and south through the central section of the province and will ultimately connect Vancouver with Prince George. When extended through to the Peace River it will tap a further vast area of timberland comprising important pulpwood stands.

Alaska Timber Averages 25,000 B.F. Per Acre

The average stand per acre for the commercial forests as a whole is about 25,000 board feet, but the individual logging units vary widely from this average. A volume of 30,000 to 40,000 board feet per acre is common on many extensive areas, and 50,000 feet or more per acre frequently occurs on small units. The majority of the merchantable trees are from 2 to 4 feet in diameter and from 90 to 140 feet in height.—From "Pulp Timber Resources of Southeastern Alaska."

Hardy S. Ferguson & Co.

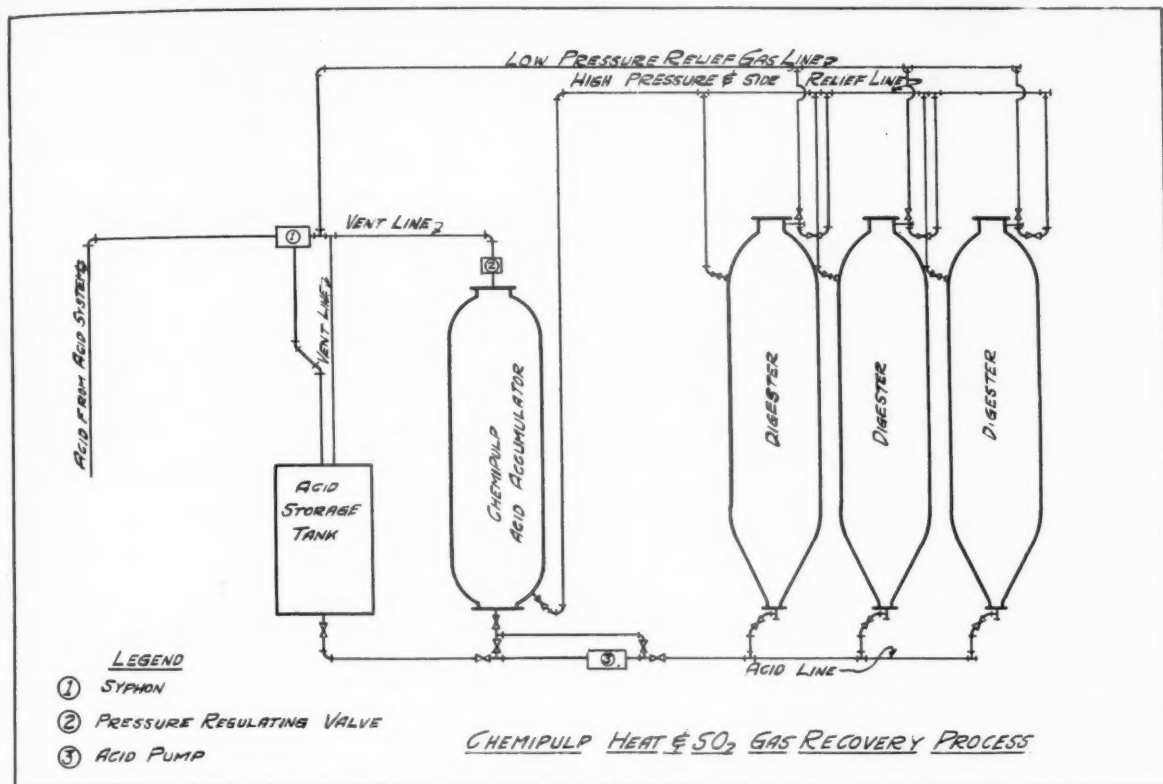
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A revolutionizing process for hot SO₂ gas and liquor recovery which effects a saving of 2000 to 2500 pounds of steam for each ton of sulphite pulp produced, reduces sulphur consumption by 5% or more, absolutely eliminates monosulphite deposits and appreciably increases the yield above that obtained by the ordinary sulphite pulping process. It opens the way to the manifold advantages obtained by the rapid penetration of chips with hot acid and permits a shortening of the cooking cycle while improving the pop test and tearing quality as well as materially reducing the bleach consumption.

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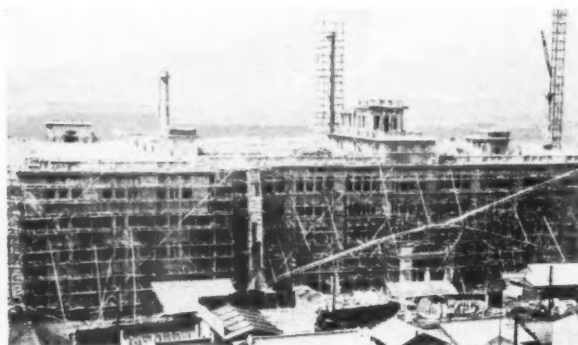
CANADIAN STEBBINS ENGINEERING AND MFG. CO., Ltd.

MONTREAL, P. Q.

Soviet Paper Industry

(Continued from page 114)

bearing on the possibilities for Pacific Coast paper mills to secure some of Russia's trade. From an analysis of the demands and the supply, the chances are not very promising, and it appears certain that the



Building the new Volga Mills of the Central Paper Trust

Soviet production will become a very formidable international competitor in the near future.

Until the Soviet mills produce all types of paper required for their national uses, American mills are just as welcome, if not more so, to compete for the business as those of Europe. The Amtorg Trading Corporation, the official purchasing organization of the Soviet government in the United States, is the only avenue for making sales. On the other hand, the

Soviet government is making attractive overtures to foreign capital and progressive American paper and pulp manufacturers might find it to their advantage to operate a concessionary mill in the untouched forests of Siberia. Those forests are going to be developed, and with the expansion of the Soviet paper industry, at the present and proposed rates, they will have a great surplus of products to sell abroad in the near future. Russian trade with the Pacific Coast is rapidly developing, due to the development of the Siberian area which has not received the attention given to Russia proper. The firm of Albert and Kunst, of Vladivostok, East Siberia, have made purchases of paper from Japan for shipment to Siberian points, but the situation changes so rapidly that they may not be interested for any great length of time, and will, on the other hand, begin to offer Soviet paper products for export.

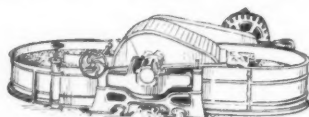
We must constantly bear in mind the principal points of timber and paper development in Soviet lands. In 1913 the exploitation of Russia's timber resources had just begun; they had no accurate surveys of their reserves as they have today. At that time, however, Russia supplied 37% of the world's timber, 45% of which was cut and shipped from the Finnish areas. Today, they know by accurate surveys that they have 3,150,000,000 acres of forest area, or approximately three times the total in the United States and Canada together. A large percentage of this timber is located in the Siberian area, where many of the new mills are being constructed. This makes them a doubly potential competitor for the Pacific mills of America.

Six months ago it appeared that it would take five

The "BEATERSCOPE"

(Copyright and Patent Applied for)

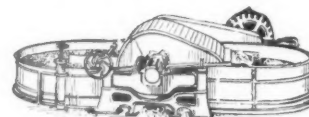
Makes it Easy to Prevent this Condition in Your Beater Room



BEATER No. 1

Change in Freeness	78 points
Change in Test	13 points
Beating Time	3 hours
Efficiency	100 %

They look alike and hold EXACTLY the same weight and quality of stock and supposedly are set the same but see what a difference in the result.



BEATER No. 2

Change in Freeness	30 points
Change in Test	2 points
Beating Time	3 1/2 hours
Efficiency	1 %

The "BEATERSCOPE" caught the difference; the laboratory tests proved the difference. A simple mechanical change and a setting of the roll with the aid of the "BEATERSCOPE" brought No. 2 up to 100% efficiency. The "BEATERSCOPE" takes all guess work out of setting the roll.

One "BEATERSCOPE" together with a booklet giving practical details as to beater room operation together with full directions for calculating beater efficiency will be sent prepaid anywhere in the U. S. A. for \$10 cash with order. (For Canada and abroad add duty and postage extra.) This booklet has been written in cooperation with an internationally known beater room superintendent and contains information of value to every paper mill manager, superintendent, chemist, engineer and operator.

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CHEMICAL ENGINEER

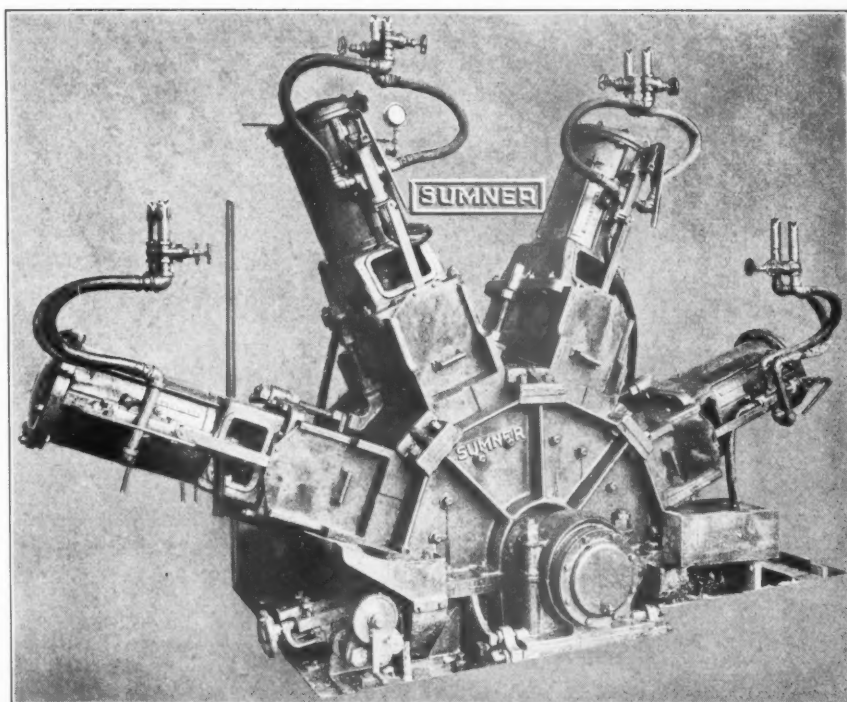
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The Same Now in Operation in the Columbia River Paper Mills, Vancouver, Washington



Machine is of heavy design having rigid webbed sides on large base.

Cylinders are 16-inch bore, brass-lined and are fitted with special three-way valves.

Pistons have special flexible joint connection to rods and pressure feet.

Pockets are adjustable by large bolts to take up for wear on stone, and openings are provided with sliding steel doors.

Arbors are of forged steel fitted with case steel flanges with bronze screw bushings.

Bearings may be furnished either lined with babbitt or lignum vitae or fitted with heavy duty Hyatt Roller bearings.

Grinder is fitted with geared screw device for turning stone.

We also build other machinery for pulp mills and chip plants.

Let Us Figure on Your Requirements

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years to develop the Siberian area. Today, it appears that keen competition in some lines of paper may become a reality within the near future. Cheap labor, cheap power, and lower costs of living help to fortify the Soviet paper production and expansion. Generally speaking, the Soviet marketing agencies do not indulge in price cutting to gain markets. Whether this will apply in the paper program remains to be seen. It is certain that the Soviet mills must find markets for their surplus or cease expansion, and since expansion of industry is vital to every corner of the Soviet Republics, American manufacturers will have food for thought as that expansion takes place.

Hydro-electricity and transportation are both making great strides in Russia and Siberia today, and this accounts for the expediting of the paper mill industry program. Two-thirds of their forest area has been surveyed as pulp wood under reforestation allotments. The combination of all of these elements appears as more than a spectre on the horizon of America's paper industry.

Fire Lookout Towers for Olympic Forests

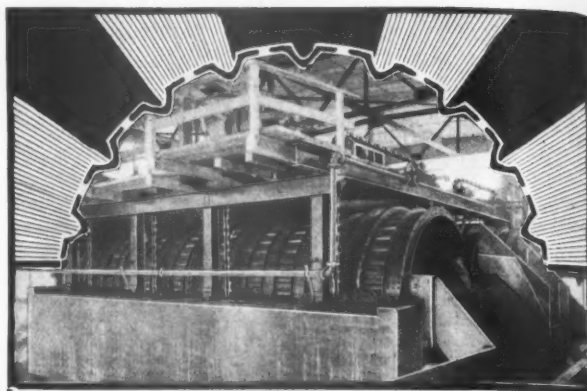
As one step in a general campaign to rear a defense against forest fire hazards in the timber of the Indian reservations in the Olympic peninsula, particularly the Quinault and Quillayute reservations, a standard forest observation steel tower, 80 feet high, has been purchased by the Taholah Indian agency and is now being erected on the Quinault reservation. It will be fully equipped and available for use during the next fire season.

The tower was purchased recently and is already on the reservation ready to be put up. During the fire season a man will be stationed at this tower on the lookout for fires. The Indian service does not intend to abandon the patrolling of the ocean beach and the Olympic highway, as in the past, but it is a recognized fact that the lookout system is the most economical and efficient method of securing early discovery and prompt action upon fires which are apt to occur at random in a broad expanse of timbered country.

The first tower will be known as the Point Granville tower and is to be about three mile east of the ocean at a point about four and a half miles north of Moclips at a place of high elevation south of the Quinault river inside the Indian reservation. The timber in the immediate region has been logged, giving an excellent view of the entire southern part of the reservation and for many miles south of the reservation. This tower, along with the several others that are to be erected from time to time, will be equipped with the most modern instruments for the detection of fires, including powerful field glasses and an Osborne Fire Finder, which is a telescopic instrument mounted on an oriented map of the country which the tower looks over, enabling the lookout definitely to locate a fire.

The outstanding advantages of southeastern Alaska as a location for manufacturing newsprint are water transportation to the markets of the world and abundant water power and timber resources.

The extensive forest resources of southeastern Alaska will undoubtedly be exploited chiefly for the manufacture of newsprint paper because of unusually favorable conditions there for the large-scale operations that now characterize that industry.—From "Pulp Timber Resources of Southeastern Alaska."



U-BAR SLAB BARKING

In the
Union Bag and Paper Mills

"VERY satisfactory," say the Union Bag and Paper Mills of their **U-Bar** Drums used for SLAB Barking. And no matter how strict your requirements are for CLEAN pulp, the **U-Bar** SLAB Barking method will meet them. No unnecessary loss of wood fibre—just good clean barking.

Built to Fit the Job—The famous **U-Bars**, originating in this drum, are designed especially for this purpose in the strongest structural shape practicable. Made of special high-carbon steel and riveted to a series of ship channel rings. Slabs strike only the rounded tops of the **U-Bar**, thus bruising is reduced to a minimum.

Chain suspension with special guide rolls, sprockets and spring takeups made **BIG PRODUCTION** possible with *smoother* hence *faster* rotation. And the special rugged construction insures *continuation* of **BIG** output.

There are 300 in mills the world over—Ask the mills that use them.

The Morterud System

Production records of the Union Bag and Paper Mills also attest to the efficiency of the Morterud System of Indirect Soda and Sulphate cooking. It produces an *even cook* and a greater yield with forced circulation of preheated liquor. Steam is not introduced directly into the digester but circulates through a series of seamless steel pipes and the condensed water is pumped back to the boilers. Therefore there is *no dilution*, but an actual increase in density of the black liquor. Less liquor used. Hence bigger and better production at lower cost.

Full Details Sent on Request

Fibre Making Processes, Inc.

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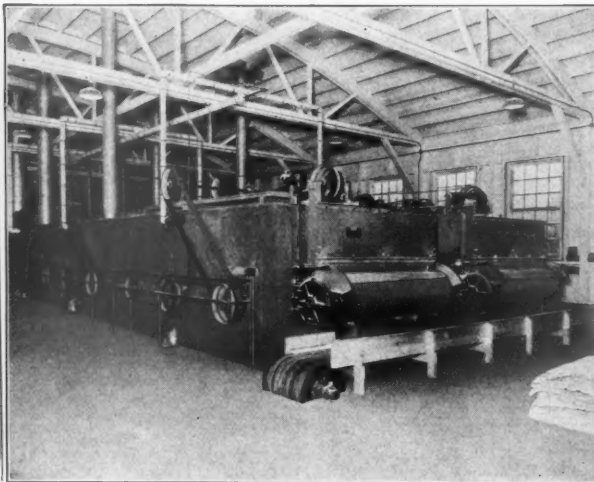


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*Experience in complete installations make
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*New type pulp shreds coming off Dryers
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*Unwrapped Pulp Storage, Union Bag Pulp Mill,
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*Weighing Bales, Union Bag Pulp Mills,
Tacoma, Washington*

DRY PULP
SAME MULLEN TEST AS WET SHEET
IN BEATER

TECHNICAL ECONOMIST CORPORATION

40 Rector St., NEW YORK CITY

Evaluation of Chemical Pulp

(Continued from page 120)

the tests E and F, in fact, too hard, as F probably is beyond the maximum strength.

Sample No.	Strength	Freeness	Corrected Freeness	Per Cent Consistency	Copper No.	R No.
25 A	44.3	598	600	0.50	1.39	191
B	75.3	520	520	0.50	1.67	234
C	99.3	425	425	0.50	1.83	233
D	98.8	358	360	0.50	1.27	282
					1.49	240
E	123.6	318	310	0.48	1.14	336
					1.39	275
F	143.0	182	190	0.52	1.70	159
					2.09	131

Owing to some smaller deviations found previous to the last tests, conditions for the copper number were intentionally changed and the determinations also kept apart in the table. The first figure in each line was obtained by starting the copper number test at once after measuring 500 cc of pulp solution. The second tests were started four hours later in D and E and 16 hours later in F. The new kind of copper number used in this work is still in its earliest stage and no definite statement can be made yet as to the best practice.

Since, however, this test no doubt seems to be controlled by some kind of hydration or action between water and fibres, which also governs strength and freeness, it would not be unreasonable to assume that some time is necessary to bring these conditions to an equilibrium, at least in a beater which could be suspected to affect the fibres in an entirely different manner from other grinding machinery. The rather good agreement between earlier tests may have been due: First, to some experimental habits, especially in starting the corresponding copper number tests, as a rule generally

some hours later and, second, of course, to the different action of pebbles on fibres, which are squeezing them more, thus giving the water better access. Even at the time it could be observed that physical changes between pulp and water took place shortly after the 500 cc were sampled.

The following tests are of interest here: After sampling No. 25 F the beater was stopped for two days. Then it was started again with lifted roll and run for about two or three minutes, to mix well, and new samples were taken. They gave: Strength, 110.5; corrected freeness, 205; % consistency, 0.60. The copper number was:

Sample standing	5 Min.	1.67	R. Number: 135
Sample standing	15 Min.	1.77	R. Number: 127
Sample standing	1 Hr.	1.69	R. Number: 134
Sample standing	4 Hrs.	1.62	R. Number: 139
Sample standing	4 Hrs.	1.75	R. Number: 129
Sample standing	10 Hrs.	1.85	R. Number: 122
Sample standing	24 Hrs.	1.69	R. Number: 134
Sample standing	24 Hrs.	1.63	R. Number: 139

It is obvious that the fibres had had time to reach an equilibrium with the water during two days standing. It could not be expected, therefore, that any difference would show up. But it is very interesting to note the rise in freeness, the drop in strength and yet, through the lower copper number the R-number remained about constant.

If we make a little allowance for this lack of experience with an entirely new test, the comparison between the R-numbers of experiments No. 18 and No. 25 gives a wonderful agreement and it is most probable that the Lampen, Dalen and other mills will also give the same figures, good internationally comparable results.

Also it can be expected that the consideration of finer points in physical testing, as constant humidity,

Industrial Chemicals

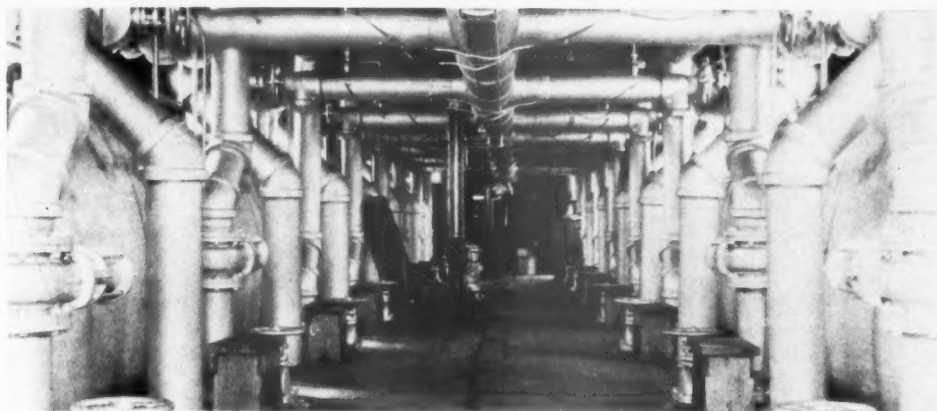
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CALIFILTER 12,000,000 GALLON CAPACITY INSTALLATION IN A
PACIFIC COAST PAPER MILL

WATER PURIFICATION

CALIFILTERS of 38,000,000 gallons capacity are operating in pulp and paper mills of the Pacific Northwest furnishing pure water for the manufacture of the highest grades of pulp and paper.

We are available for consulting service on water problems.

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roll pressure etc., will bring about a still better agreement in R-numbers, although the present state seems to satisfy technical needs. It appears at this time far easier to get a general agreement with this quality figure which can always be expressed by the full equation given above. It also seems possible to work with different machinery, especially with experimental beaters, which have the advantage of using a far greater sample and assuring a much better average.

I need not say that the classification of stocks and our knowledge of the true copper number as well as of different strength testing apparatus will profit by more experience along this line and that we very probably will get much better acquainted with the nature of pulp suspensions in general. We also may gain in understanding the different kinds of cellulose compounds down to molecular spaces, the former being attempted lately by Dr. Th. Lieser (*Cellulosechemie*, 1929 No. 2) using the action between cellulose and caustic soda and sulphur.

Further efforts to perfect the new copper number determination have already led to very interesting theoretical and practical discoveries, and with some more experience we will get a thorough understanding, at least of the mechanical side of this physico-chemical testing method.

I am indebted to a great extent to the Resident Manager W. L. Ketchen of the B. C. Pulp & Paper Company's Port Alice mill for the far-sighted support he has given me.

I am also pleased to give a note of thanks to many mill executives along the Pacific Coast, who kindly helped by supplying samples.

Forest Taxation

(Continued from page 90)

understanding of the financial condition of the counties where forest interests are important. It would be idle to propose remedies for the forest tax situation which would be impracticable from the standpoint of public finance. Owing to the limited time and resources available, it was impossible to cover the two states entirely, but, taking the selected counties already named as samples, detailed analyses of revenues and expenditures were made by an economist who is experienced in this kind of work. As a background, the financial condition of each state as a whole and the extent to which it depends upon taxes on forest land were investigated.

The preceding outline covers briefly some of the principal lines along which the Forest Taxation Inquiry has been working. It has a very large task before it in compiling and digesting the enormous mass of information which has been collected. Obviously this will take time. Progress reports will be issued as soon as practicable, in order to give our cooperators and others of the two states who are interested in legislation this winter the utmost possible benefit of the data collected. The Inquiry regards its entire study of forest taxation as a nation-wide unit, into which it must eventually fit the information and conclusions drawn from its work in the different regions. It expects to find the data which have been obtained in the Pacific Northwest of great value in forming its final conclusions, both as to the underlying principles which should govern tax reform and as to the more specific applications which it may wish to suggest for the benefit of the states of Oregon and Washington.

V. D. SIMONS

Industrial Engineer

Pulp and Paper Mills, Hydro-Electric and
Steam Power Plants, Electrification
Paper Mill Properties



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Number